VRC 89XX Radio Terminal

Product Reference Guide for Embedded Windows® CE .NET

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Product Reference Guide
for Embedded Windows® CE .NET

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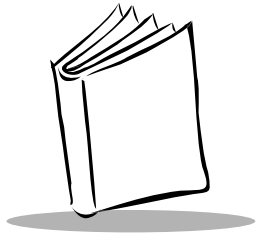

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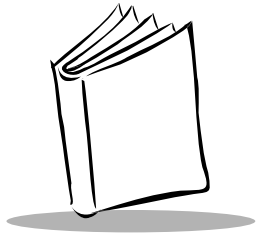

About This Guide

Introduction

The *VRC 89XX Radio Terminal Product Reference Guide for Embedded Windows® CE .NET* provides general instructions for setting up, initializing, operating, troubleshooting and maintaining the VRC 89XX Radio Terminal.

Chapter Descriptions

- Chapter 1, *Getting Started*, describes how to set up the terminal.
- Chapter 2, *Installing the Terminal*, provides instructions on installing the terminal in a vehicle.
- Chapter 3, *Software Installation on the Development PC*, provides information on the Software Developer's Kit.
- Chapter 4, *Operating the Terminal*, provides detailed instructions on how to use the terminal.
- Chapter 5, *Spectrum24 Network Configuration*, describes the utilities that monitor and configure the Spectrum24 wireless connection.
- Chapter 6, *Configuring the Terminal*, describes options for configuring the terminal to assist in planning your application development.
- Chapter 7, *ActiveSync*, explains how to use ActiveSync® for communications between the terminal and host PC.
- Chapter 8, *Maintenance and Troubleshooting*, provides information about possible problems with the terminal and suggested solutions to these problems.
- Appendix A, *Specifications*, details the technical specifications of the product.

Notational Conventions

The following conventions are used in this document:

- *Italics* are used to highlight specific items in the general text, and to identify chapters and sections in this and related documents. It also identifies names of screens, menus, menu items, and fields within screens.
- `Courier text` identifies buttons to be tapped or clicked on screens.
- Bullets (•) indicate:
  - action items
  - lists of alternatives
  - lists of required steps that are not necessarily sequential
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.

Related Documents

- *VRC 89XX Radio Terminal Quick Reference Guide for Embedded Windows® CE .NET,* p/n 72-66347-xx
- *VRC 7900/8900 DC Power Cable Quick Reference Guide*, p/n 72-57649-xx.

Service Information

If you have a problem with your equipment, contact the *Symbol Support Center* for your region. See page ix for contact information. Before calling, have the model number, serial number, and several of your bar code symbols at hand.

Call the Support Center from a phone near the scanning equipment so that the service person can try to talk you through your problem. If the equipment is found to be working properly and the problem is symbol readability, the Support Center will request samples of your bar codes for analysis at our plant.

If your problem cannot be solved over the phone, you may need to return your equipment for servicing. If that is necessary, you will be given specific directions.

Note: *Symbol Technologies is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty. If the original shipping container was not kept, contact Symbol to have another sent to you.*

Symbol Support Center

For service information, warranty information or technical assistance contact or call the Symbol Support Center in:

United States

Symbol Technologies, Inc.
One Symbol Plaza
Holtsville, New York 11742-1300

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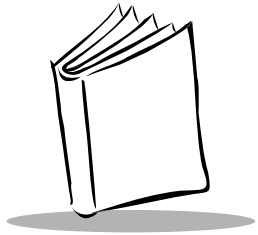
If you purchased your Symbol product from a Symbol Business Partner, contact that Business Partner for service.

For the latest version of this guide go to:http://www.symbol.com/manuals.



Chapter 1
Getting Started

Introduction

The VRC 89XX Radio Terminal is a rugged, vehicle-mounted terminal designed to run logistics and warehousing management systems. The terminal is configured as either an RF terminal, providing real-time Wireless Local Area Network (WLAN) communications, or as a batch terminal, downloading gathered information as required. The Windows® CE .NET operating system enables you to develop custom applications easily, and load additional software as necessary.

The terminal incorporates wireless LAN technology (2Mbps or 11Mbps) and is powered by a 32-bit processor. A touchscreen and optional 62-key keyboard allow easy data input, displayed on a 12.1" SVGA, high contrast backlit LCD.

You can connect a scanner or ActiveSync cable using the two RS-232 serial ports on the connector panel on the bottom of the terminal, and connect a USB device via the USB port.

The VRC 89XX

The VRC 89XX terminals consist of the following models:

- VRC 8942: Performs wireless networking using Symbol's Spectrum24® 2Mb radio.
- VRC 8946: Performs wireless networking using Symbol's Spectrum24® 11Mb radio.

Unpacking the Terminal

Carefully remove all protective material from around the terminal and save the shipping container for later storage and shipping.

Verify that you received all equipment listed on the packing slip and inspect the equipment for damage. If there are any items missing or damaged, contact the Symbol Support Center immediately (see page ix).

Parts of the Terminal

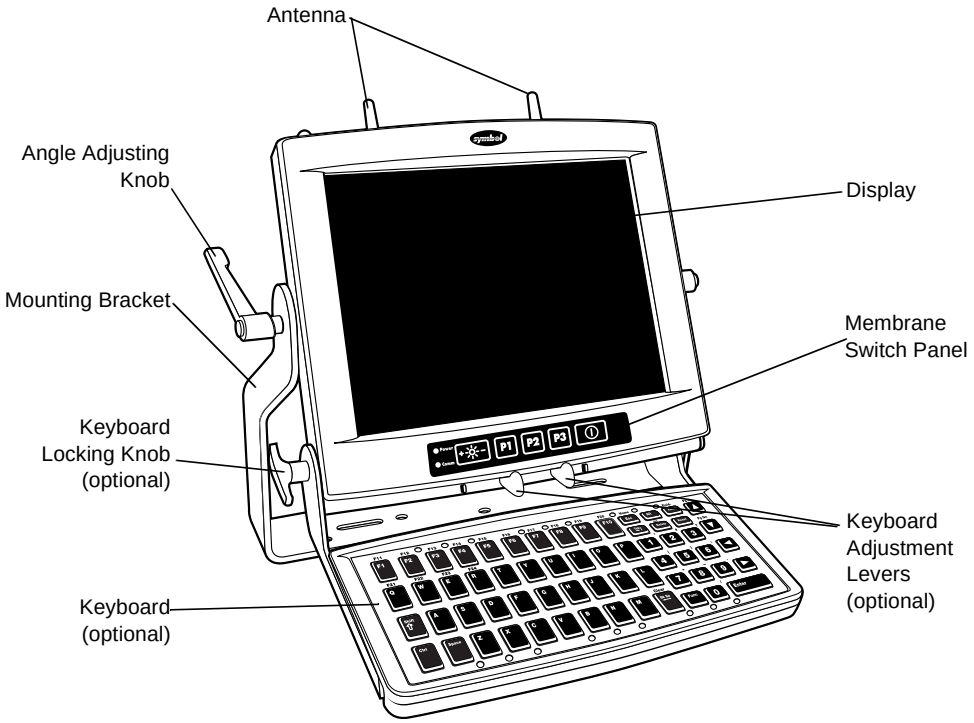


Figure 1-1. Front View

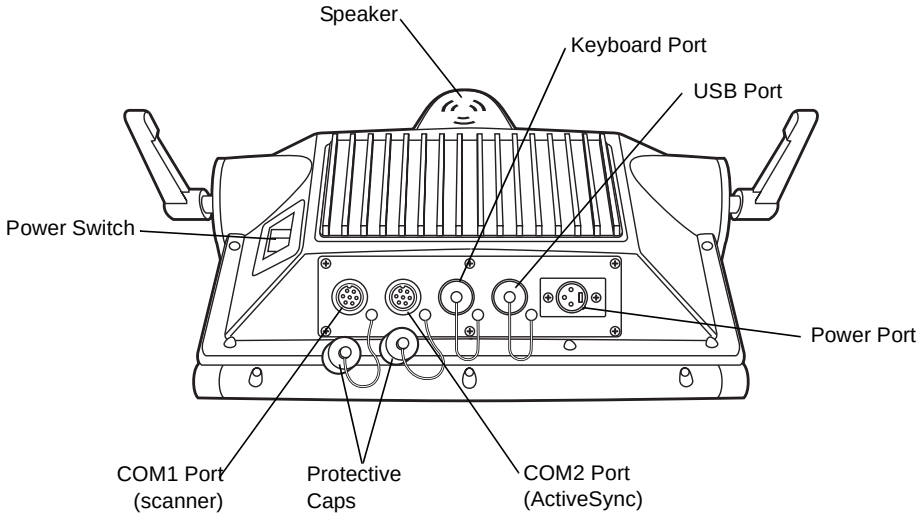


Figure 1-2. Bottom View

Accessories and Peripherals

The VRC 89XX comes with an installation kit which includes all necessary connectors and cables. See *Installation Kit Contents* on page 2-4 for a list of items.

Optional Accessories

You can order these optional accessories from Symbol:

- External keyboard with bracket assembly:
  Non-heated: KYBD8900-00
  Heated: KYBD8900-01
- Scanners:
  LS-3203ER-I200EI: 25-52923-01
  P302FZY-I001: 25-52741-01
  P304PRO-I000: 25-55774-01
  P370ALR-I000: KT-???
- Scanner cable (scanner specific)
- RS-232 ActiveSync cable: 25-51869-01

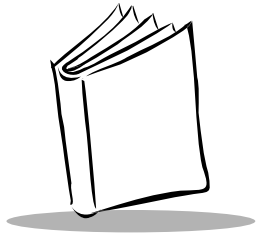
- USB cable:
  ActiveSync: 25-56101-01
  Host: 25-56102-01
- AC universal power supply:
  Power supply: 50-14001-004
  Output cable: 50-16002-024
  Line cord: 23844-00-00
- Filter box (used on gasoline-powered trucks to shut off the terminal when the forklift ignition is turned off, and to filter noise on power cables): FB7900
- Installation Kit (see *Installation Kit Contents* on page 2-4 for a list of contents)

Note: *Use only a Symbol-approved power supply, output rated 12V dc and minimum 9A (p/n 50-14001-004). The power supply is certified to EN60950 with SELV outputs.*

Benutzen Sie nur eine Symbol Technologies genehmigt Stromversorgung in den Ausgabe: 12V dc und minimum 9A (p/n 50-14001-004). Die Stromversorgung ist bescheinigt nach EN60950 mit SELV Ausgaben.

Radio Cards

VRC 89XX terminals include an internal radio card for use with Symbol Spectrum24 networks. Contact Symbol Technologies for more information on radio cards.



Chapter 2
Installing the Terminal

Introduction

This chapter describes how to install your terminal in a vehicle. There are different installation options depending on the type of vehicle you operate. Read all of the following instructions before you begin.

Caution

A competent engineer must perform the installation in a vehicle. Improper installation can damage your vehicle and/or the VRC 89XX.

Do not install the terminal in a location that will affect vehicle safety, drive-ability, or visibility.

WARNING

The VRC 89XX is intended for use on vehicles primarily operating indoors, or for fixed indoor installation. The VRC 89XX should not be installed in fixed outdoor locations, or on a vehicle primarily operating outdoors, unless additional environmental protection is provided.

Note: *The terminal and bracket must be firmly secured to a surface that can support the terminal's weight.*

Table 2-1 on page 2-4 lists the parts in the installation kit included with your terminal.

Installing Your Terminal

Follow the instructions below to properly install your terminal in a vehicle.

Positioning the Terminal

- Determine the best position for the terminal and all the associated components. If a similar terminal was previously installed, check to see if the position it used is suitable for the VRC 89XX.
- Test the installation for at least 30 minutes before installing on another vehicle. Record all details:
  - Check that the positions of the terminal and filter box do not obstruct vehicle controls.
  - Check that the terminal does not obstruct the driver's view.
  - Check the position of the terminal for user comfort over long periods.
  - Ensure the filter box is not fitted in a confined space where it may overheat.

Important Fixing Information

Any modification to supplied mountings could cause early failure of the unit/mountings.

- A minimum of four fixing positions must be used.
- All nuts/bolts/end clamps to be checked periodically and tightened if required.
- When installing the unit, care must be taken to ensure that the mounting bracket footprint is fully supported.
- Additional plates may be required to achieve this.

Routing Electrical Cables

- Establish a neat route for the cable, staying clear of moving parts or hot surfaces wherever possible.
- Fix the cable to existing cable runs inside the vehicle using cable ties (item 4, Table 2-1), but make sure they are away from any moving or hot surfaces.
- When the cabling must go through a panel, use a suitable gland (item 3, Table 2-1).
- When fixing the conduit or cable on the outside of a vehicle, use P-Clips (item 12, Table 2-1). Either drill and tap the hole or use a nut and bolt to secure the clip.
- Make sure the cable does not have tight bends. The minimum recommended radius is 2.5".
- Solder all fuse holders. DO NOT crimp.
- After soldering the fuse holder, file the solder flat where it comes in contact with the fuse.
- On electric vehicles, take the power from as close to the battery as possible, but not directly from the battery terminals, and not before any main fuse.
- On gasoline, diesel or propane vehicles, take the power from as close to the battery terminals as possible, and avoid using existing wiring.
- All fuses must be as close as possible to the power source.
- If you are unsure of the correct power source, contact the vehicle manufacturer for more information.

Installation Kit Contents

Table 2-1 lists the parts included with your terminal.

Table 2-1. Installation Kit of Parts

Item	Description	Quantity
1	VRC 7900/8900 installation power cable	1
2	VRC 89XX Radio Terminal Quick Reference Guide for Embedded Windows® CE .NET	1
3	20 mm cable glands	1
4	300 mm cable tie	12
5	100x2.5 mm cable tie	1
6	6.3 mm blue push-on crimps	2
7	10 mm blue ring crimps	2
8	Scotchlok standard tap	2
9	Fastmm blue piggyback crimps (installation)	2
10	1.24 in Bulgin fuseholder; UL rating	2
11	10 A F/A ceramic 1.25" fuse	2
12	10 mm PVC covered aluminium 'P' clip	6
13	VRC 894X power cable label	1
14	VRC 894X installation kit label	1

Installing the Terminal

Follow the instructions below for the correct terminal installation in your vehicle. Figure 2-1 shows the terminal installation on a 12-24V gasoline, diesel, or propane vehicle. Figure 2-2 shows the installation on an electric vehicle operating up to 60V.

12-24V Gasoline, Diesel, or Propane Vehicles

Refer to Table 2-1 for item descriptions. Refer to Figure 2-1 for installation.

- Use of the filter box is recommended.
- All power wiring must use the cable specified in item 1.
- Fuse in positive rail = 10A max (item 11).
- Fuse in negative rail = 10A max (item 11).
- Fuse in switched positive = 2A max (when using the Filter Box).
- Keep the path between the battery and the terminal as short as possible, and away from any part of the ignition high tension system.

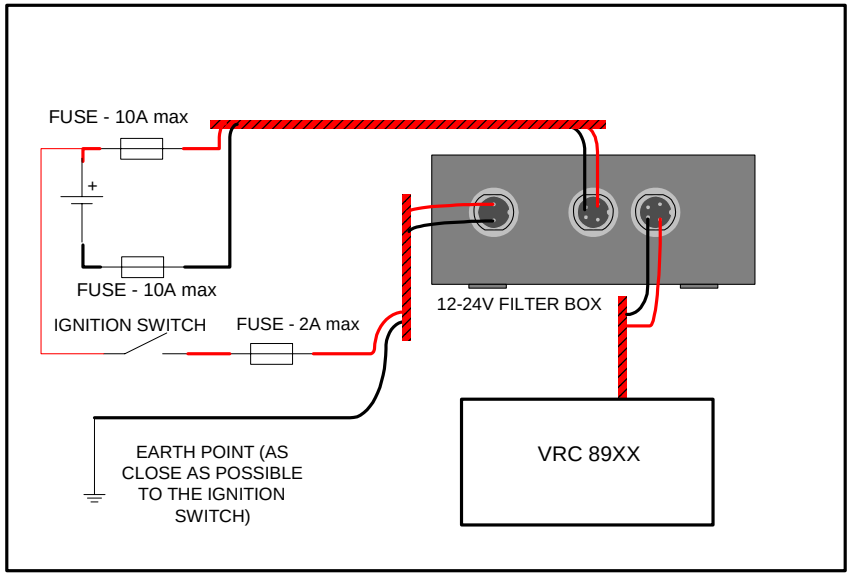


Figure 2-1. Installation of 12-24V Gasoline, Diesel, or Propane Vehicles

Electric Vehicles Up to 60V

Refer to Table 2-1 for item descriptions. Refer to Figure 2-2 for installation.

- All power wiring must use the cable specified in item 1.
- Fuse in positive rail = 10A max (item 11).
- Fuse in negative rail = 10A max (item 11).
- Use a filtered supply if available on the FLT. Consult the FLT manufacturer for details.

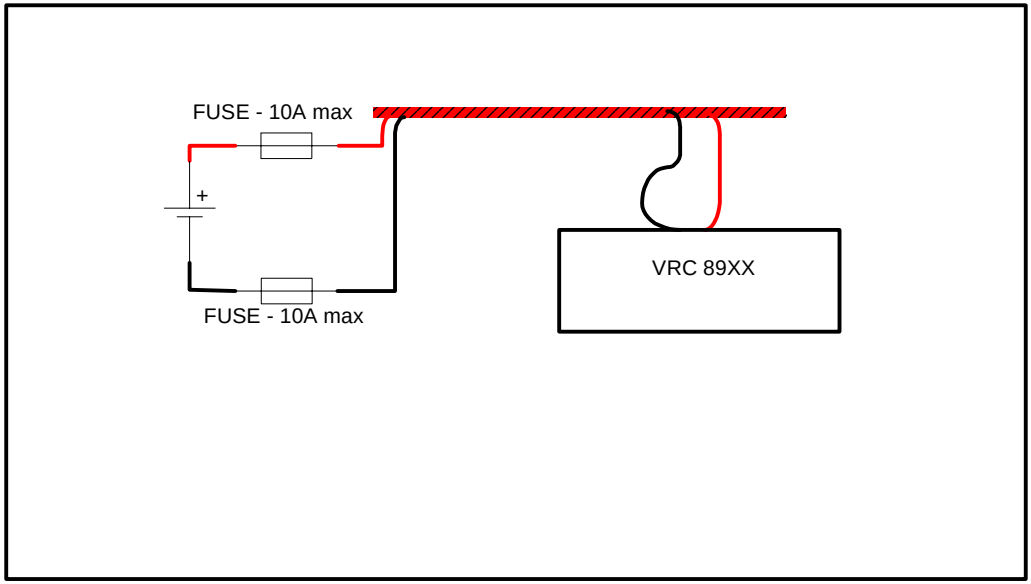


Figure 2-2. Installation of Electric Vehicles Up To 60V

Providing Power to the Terminal

WARNING

A Lead Acid battery can leak Hydrogen gas. A spark anywhere near the battery can cause it to explode. Always make your final connection to power as far away from the battery as possible. For example, connect the power cable to the battery first, then connect it to the terminal.

Follow the instructions below to connect power to the terminal using the filter box.

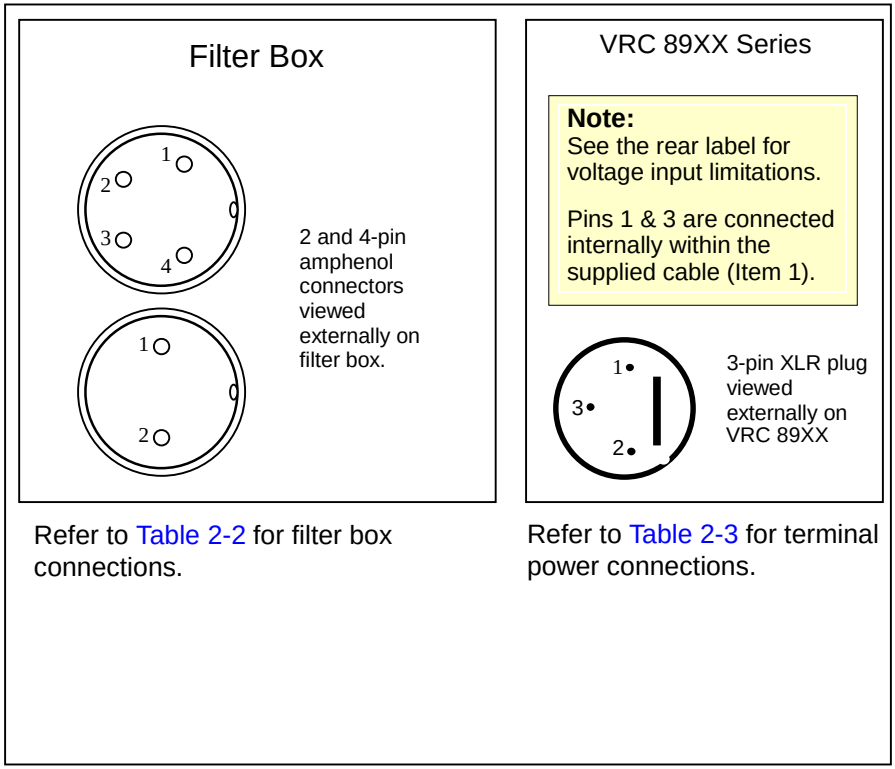


Figure 2-3. Connecting Power to Your Terminal

Table 2-2. Filter Box Connections

Filter Box Connections	
Wire 4-pin Amphenol connector as follows:	
Pin 1 or 4	Positive (red and green joined together)
Pin 2 or 3	Negative (black and white joined together)
Wire 2-pin Amphenol connector as follows:	
Pin 1	Positive (red and green joined together)
Pin 2 (may be marked as pin 3)	Negative (black and white joined together)

Table 2-3. Terminal Power Connections

Terminal Power Connections	
Wire 3-pin XLR socket connector as follows:	
Pin 1	Positive (red and green joined together)
Pin 2	Negative (black and white joined together)
Pin 3	Not connected

Connecting AC Power to Your Terminal

You can power your terminal away from a vehicle using an AC universal power supply, an AC line cable, and a DC power cable available from Symbol Technologies.

To provide power from an AC source:

1. Insert the AC power cable into the AC connector on the universal power supply.

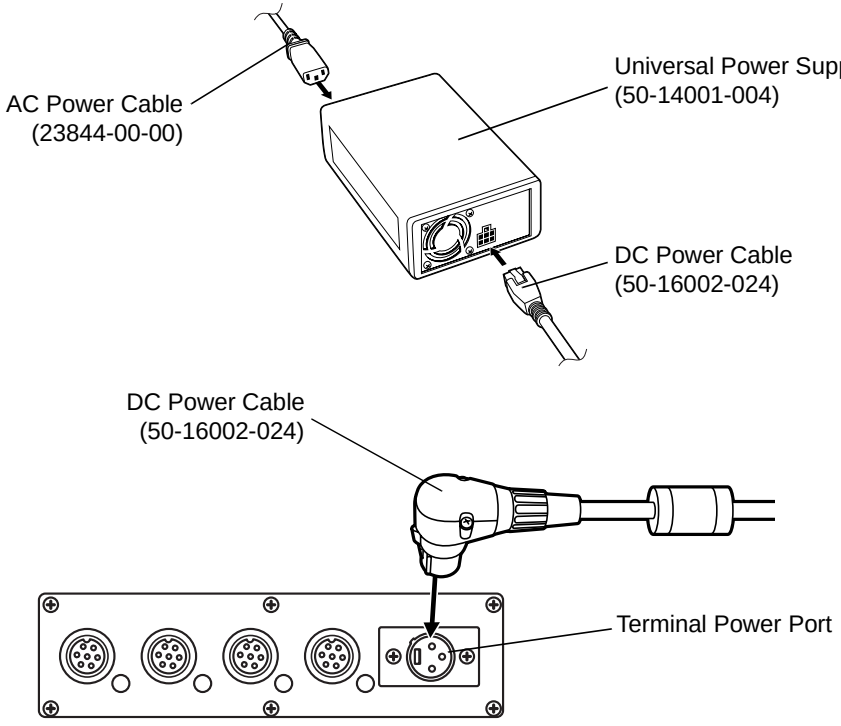


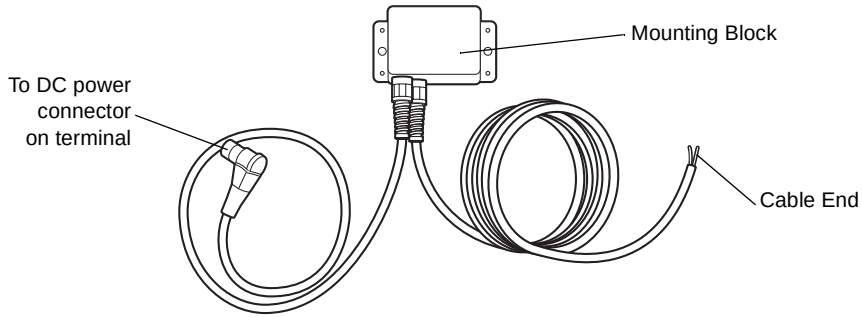
Figure 2-4. Connecting AC power

2. Plug the other end of the AC power cable into a wall outlet.
3. Insert the DC power cable into the DC connector on the universal power supply.
4. Plug the other end of the cable into the terminal's power port.

Connecting the Filtered DC Power Cable for Electric Trucks

This section describes how to connect and use the filtered DC power cable to provide power to the terminal when mounted on an electric truck.

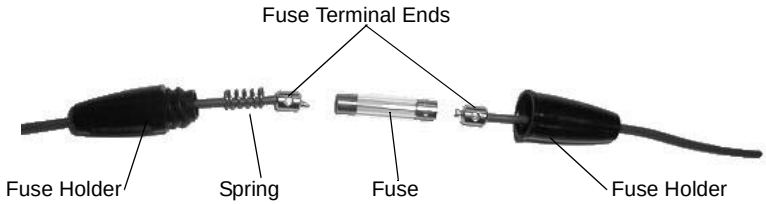
The cable consists of two ends connected to a central mounting block.



Connecting the Cable

1. Disconnect the electric truck battery. Never perform installations on a live electric truck.
2. Secure the mounting block to the desired location in the truck, using #8 screws. Ensure the DC power connector reaches the terminal and the cable end reaches the DC power source when routed through the truck. Secure the power cable with cable ties.
3. Cut off excess cable at the cable end, and strip 12” off the outer jacket to reveal the screen. Cut the screen back to about 2” and twist the screen strands together.
4. Connect the screen to the truck's chassis. If you cannot find a close connection point, solder an extra length of cable to the screen to extend the connection to the chassis. Use a heat shrink to cover the solder joint.
5. Crimp a ring terminal onto the screen/cable extension and screw the ring terminal into the truck metal work. Or, if a bolt connection exists, attach the ring terminal to this connection (check the connection with a multi-meter to the truck chassis if you’re not sure).

6. Place a fuse holder in-line of the brown and blue wire approximately 4 inches from the cable end, as shown below.



   Solder the fuse terminal ends to the wire to ensure a proper electrical connection.

7. Connect the brown wire to the vehicle's positive power source. Connect the blue wire to the vehicle's negative power source. To terminate the cable:
   - If the vehicle has a power output connector, use a mating connector. You may be able to connect to a fuse panel with a commercially available connector.
   - If the vehicle has no power output connector, use a ring terminal (for a battery post) or blade terminal (for a fuse panel).

   See your vehicle Owner's Manual for more information.

   Ensure the wiring connections created are sufficiently insulated from each other.

8. Re-connect the electric truck battery.
9. Insert the cable's DC power connector into the terminal's DC power port. Align the keyway on the power connector with the notch on the terminal’s power port.

WARNING

A lead acid battery can leak hydrogen gas. A spark anywhere near the battery can cause it to explode. Always make your final connection to power as far away from the battery as possible, i.e., connect the power cable to the battery first, then the terminal.

Caution

Use extreme care when routing and securing this cable from the terminal to the vehicle power source. Hazards associated with improper wiring can be severe. To avoid unintentional contact between the wire and any sharp edges, use proper bushings and clamping where the cable passes through openings. If the wire is subjected to sharp surfaces and excess engine vibration, the wiring harness insulation can wear away, causing a short between the bare wire and chassis. This can start a fire.

Installation and the Internal Battery

The VRC89XX has an internal battery that preserves RAM if there is a temporary interruption, disconnection or fluctuation in the main DC or AC power.

The internal battery may be depleted when you first install it. It charges itself from the terminal's main power supply (DC or AC) when the terminal is running. It also charges when the terminal is in suspend mode (by pressing the Suspend button), but will not charge if power is removed from the terminal.

We recommend that you power on the terminal and allow the internal battery to charge for a minimum of 24 hours before using the terminal. It takes 15 hours to fully charge the internal battery. A fully charged internal battery can maintain data for up to 72 hours if the unit is disconnected from its main power source.

The Optional Keyboard

The keyboard bracket assembly contains the following items:

- Optional keyboard
- Keyboard bracket
- 4 M4 screws and washers
- Knobs
- Adjustment mechanism
- Side plates
- Bracket knobs
- 5 button-head screws
- 2 flathead screws.

Attaching the Keyboard

1. Attach the keyboard brackets to the bottom of the keyboard, using the M4 screws and washers, as shown below:

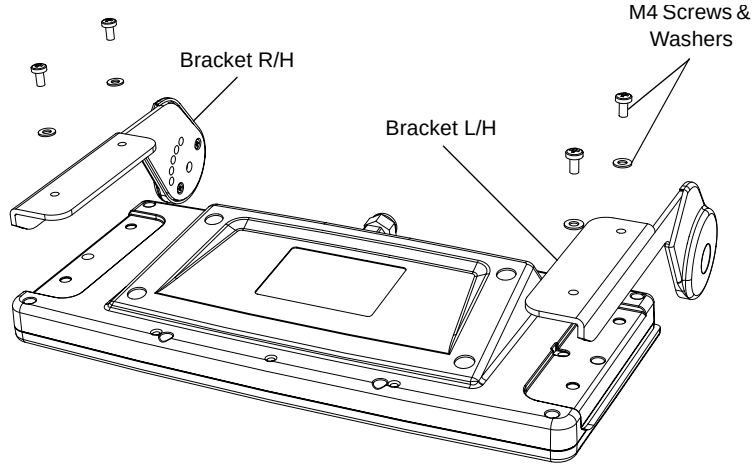


Figure 2-5. Attaching the Brackets

2. Secure the adjustment mechanism to the bottom of the display using the 5 button-head screws. Ensure the adjustment levers face forward.

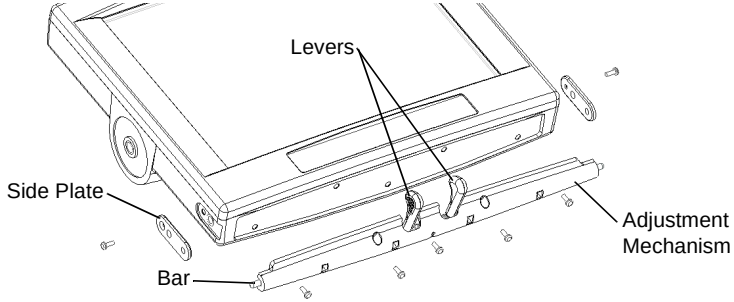


Figure 2-6. Attaching Adjustment Mechanism

3. Secure a side plate to each side of the display by inserting a flathead screw through the top hole of the side plate. Ensure the bar from the adjustment mechanism runs through the bottom hole of each side plate.
4. Squeeze the levers on the adjustment mechanism and align the keyboard brackets on either side of the display. Release the levers to insert the bar on the mechanism through an adjustment hole on each of the brackets.

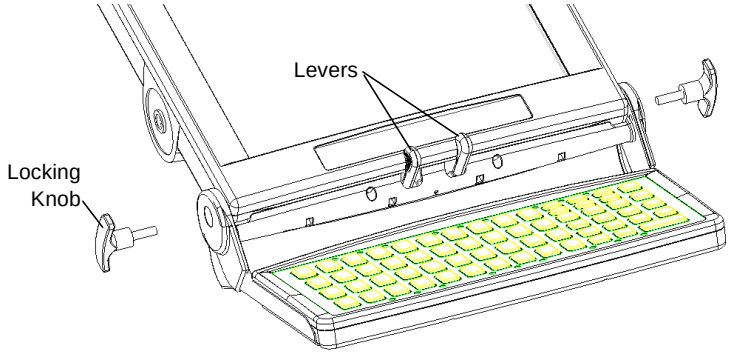
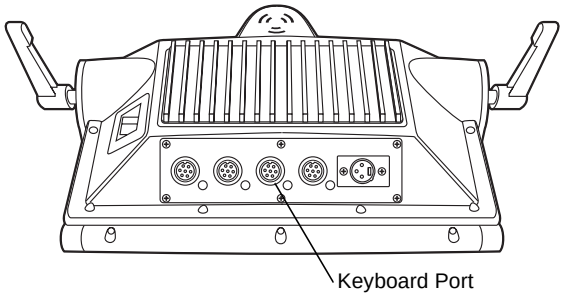


Figure 2-7. Attaching Keyboard

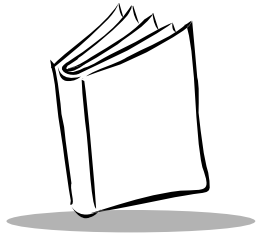
5. Insert the keyboard locking knobs through the bracket's top hole, and through the side plate's middle hole, into the terminal display.

6. Plug the keyboard cable into the Keyboard port on the VRC 89XX.



Adjusting the Keyboard

To adjust the keyboard, loosen the locking knobs, squeeze the adjustment levers, then move the keyboard to the desired position. Tighten the locking knobs.



Chapter 3
Software Installation on the Development PC

Introduction

To develop applications for your terminal, you will require additional tools for your development environment (see appropriate sections below). If you are developing multiple types of applications then you may need to install all of the utilities that are compatible with each other.

The minimum system configuration required to install is:

- IBM-compatible PC with Pentium 150 MHz processor or higher
- Windows® 98, Windows® NT4 with Service Pack 5 or later, or Windows® 2000 (Windows® NT4 or Windows® 2000 required for emulation)
- 24MB RAM for Windows® 98 (48MB recommended), 32MB RAM for Windows® NT4 or Windows® 2000 (48MB recommended)
- 360MB available hard disk space for minimum installation, 720MB available hard disk space for full installation
- CD-ROM drive
- VGA monitor (SVGA recommended)
- Mouse.

Also, be sure the hard drive you are installing to accepts long filenames (larger than the 8.3 filename convention). Before you install the utilities, install the following tools:

- Windows ActiveSync v3.7 or greater (recommended). This can be downloaded from http://www.microsoft.com.

- Adobe® Acrobat® v 4.0 or greater (recommended). This can be downloaded from http://www.adobe.com/.

Developing Applications

Software Requirements

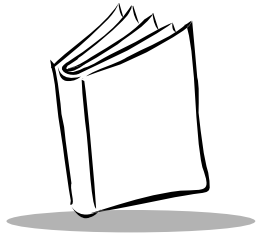
- Microsoft® Visual Studio® .NET 2003, for developing C# (C sharp) or Visual Basic .NET applications
- Microsoft eMbedded Visual C++® 4.0, for developing C++ applications.

Developing C# (C sharp) or Visual Basic.net Applications

1. Download and install Windows CE Utilities for Visual Studio .NET 2003, available from http://www.microsoft.com/. For specific details about using this toolkit, refer to the Readme.htm file available from the same website as the toolkit.
2. Download and install the Compact Frame work add on, available from http://www.microlise.com/VRC8900. To install the add on:
   a. Transfer it onto your VRC8900 using active sync, and place it in the '\FLASHFX\CAB' folder.
   b. Cold boot the terminal. The compact frame work add on is installed without deleting the original cab file.

Developing C++ Applications

Download and install the Embedded Visual C SDK, available from http://www.microlise.com/VRC8900. To install the SDK, double-click on the downloaded file and follow the on screen installation instructions as required. In order to ensure proper installation, do not change the default installation directory.



Chapter 4
Operating the Terminal

Introduction

This chapter describes how to power, initialize, and operate the terminal.

Powering on the VRC 89XX

While the terminal's processor and display are off, programs or data in the system's memory are retained. Power-up restores the display, and processing continues from where it was before power-down.

Note: *Charge the internal battery when powering on the terminal for the first time (refer to Installation and the Internal Battery on page 2-12).*

To power on the terminal:

1. Turn on the Power Switch on the back of the terminal.
2. Press the Suspend Button on the membrane panel to power on the terminal.

To suspend the terminal's operation, press and hold the Suspend Button until the *Release for Suspend* message appears.

Figure 4-1. Suspend Button

The network configuration screen displays. If desired, configure the terminal for wireless communication (refer to Chapter 5, *Spectrum24 Network Configuration*).

Note: *The network configuration screen appears the first time you start the terminal after power is removed, but not on subsequent warm or cold boots.*

To suspend the terminal's operation, press the Suspend button. All DRAM and Flash data is preserved, so the applications running continue after suspension. Press the Suspend button again to power up the terminal. This power-up process takes about 12 seconds.

The power is on at all times if the terminal is hard wired to the vehicle battery.

Booting the Terminal

Table 4-1. Suspend Button Operation

Mode	Press Suspend button
Release to Suspend	1 - 6 seconds
Release to Warm Boot	6 - 15 seconds
Release to Cold Boot	15 seconds or more

Performing a Warm Boot

A warm boot restarts the operating system, closes all running applications, and preserves the saved data in RAM. In the Windows CE .NET environment, the working registry is replaced by the latest saved copy of the registry.

To perform a warm boot, press and hold down the Suspend Button until the *Release for Warm Boot* message appears (6 seconds).

Performing a Cold Boot

A cold boot restarts the terminal. In the Windows CE .NET environment, the working registry is replaced by the latest saved copy of the registry. All information in DRAM is discarded (data in Flash is maintained).

There are two ways to perform a cold boot:

- Press and hold the Suspend Button until the *Release for Cold Boot* message appears (15 seconds).
- Turn off the Power Switch on the back of the terminal, then turn it on again, and then press the Suspend button.

Methods of Suspension

Terminal operation can be suspended in four ways:

- **Manual suspension:** the operator presses the Suspend button when the terminal is on, or taps Start, then presses the Suspend button.
- **Program-dependent suspension**: the application requests a suspend via an API call.
- **Critical suspension**: the power supply is removed.

Programmable (“P”) Keys

The programmable keys on the membrane panel (P1, P2, P3) can be set to perform certain functions, such as printing, toggling the virtual keyboard, or running a frequently used key sequence.

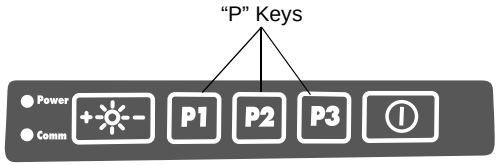


Figure 4-2. “P” Keys

To set a programmable key:

1. From the *Start* menu, select *Settings*, *Control Panel*.
2. Select the *Programmable Keys* icon.
3. Select the P key you’d like to program from the *Key:* drop-down menu.

Figure 4-3. Programmable Keys Screen, *Key* Drop-Down Menu

4. Select the function you'd like the P key to perform from the *Action* drop-down menu.

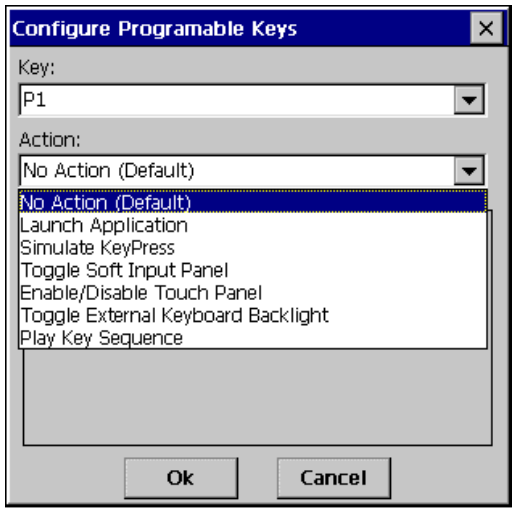


Figure 4-4. Programmable Keys Screen, *Action* Drop-Down Menu

5. Tap OK.

Using the Keyboard

The terminal has an optional QWERTY keyboard. Refer to Figure 4-5 and Table 4-2 for a description of the keys.

Adjusting the Keyboard

To adjust the keyboard, loosen the locking knobs, squeeze the adjustment levers, then move the keyboard to the desired position. Tighten the locking knobs.

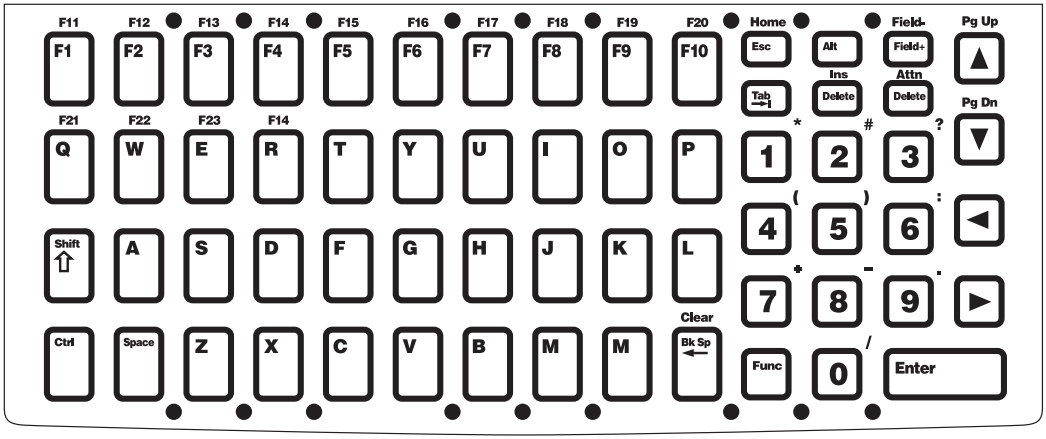


Figure 4-5. VRC 89XX Keyboard

The following table describes the general functions of the keys. Table 4-3 contains the specific keyboard mappings.

Table 4-2. Key Descriptions

Key	Description
Shift, Ctrl, Alt	Use in conjunction with other keys. Select alternate characters or functions using the information at the top of the keys. Use Ctrl - Esc key combination to access the *Start* menu.
A through Z	Enters alpha and text characters.
0 through 9	Enters numeric characters.
◁ △ ▽ ▷	Moves the cursor around the screen or highlights the lines in a menu.
F1 through F24	Programmable function keys. The application determines the use; see the software or application documentation.
Enter	Moves the cursor to the next data field or screen.
Func	Activates the function shown above the next key pressed.
Del	Deletes the character to the right of the cursor.
← or Backspace	Deletes the character to the left of the cursor.
Space	Enters a space between characters or words.

Table 4-3. Keyboard Mappings

VRC 89XX Key	Scan Code	Virtual Key	Func + (Unicode)	Shift + (Unicode)
z		5a	~	Z
x		58	;	X
c		43	@	C
v		56	$	V
b		42	%	B
n		4e	]	N
m		4d	^	M
a		41	>	A
s		53	Shell lock	S
d		44	<	D
f		46	,	F
g		47	|	G
h		48	\	H
j		4a	{	J
k		4b	}	K
l		4c	[	L
q		51	F21	Q
w		57	F22	W
e		45	F23	E
r		52	F24	R
t		54	=	T
y		59	`	Y
u		55	¬	U
i		49	£	I
o		4f	“	O

Table 4-3. Keyboard Mappings (Continued)

VRC 89XX Key	Scan Code	Virtual Key	Func + (Unicode)	Shift + (Unicode)
p		50	'	'
1		31	*	
2		32	#	
3		33	?	
4		34	(	
5		35	)	
6		36	:	
7		37	+	&
8		38	-	_
9		39	.	!
0		30	/	
Esc	1B	VK_ESCAPE	VK_HOME	VK_HOME
UP	26	VK_UP	VK_PRIOR	VK_PRIOR
DOWN	28	VK_DOWN	VK_NEXT	VK_NEXT
Delete	2e	VK_DELETE	VK_INSERT	VK_INSERT
F1-F10		VK_F1-VK_F10	VK_F11-VK_F20	
Field+		VK_OEM_FLDMINUS	Field-	Field-
Reset		VK_ATTN	Attn	Attn
BkSp		VK_BACK	VK_OEM_CLEAR	VK_OEM_CLEAR

Locking the Desktop

You can lock the desktop of the VRC 89XX to hide icons that contain configuration information such as terminal and network settings. When you lock the desktop, only the working applications display.

If you don't have the optional keyboard, use the virtual keyboard on the VRC 89XX to perform the following key sequences.

- Press the Func + "S" keys to display the password screen. Enter a password and tap OK. The terminal displays only the working applications.
- Press the Func + "S" keys again to display the password screen. Enter your password again and all icons display on the screen.

Calibrating the Screen

Calibrating Using the Display

This section describes how to calibrate your terminal so the cursor on the touch screen aligns with the tip of your stylus. If the current calibration does not allow for easy touch screen input or you want to recalibrate the screen at any time, refer to *Calibrating Using the Keyboard* on page 4-11.

To calibrate your terminal:

1. If you are using the default registry, go to step 5. Otherwise, proceed with step 2.
2. Tap the *Start* menu.

3. Tap *Settings*, then *Control Panel*. The *Control Panel* screen displays.

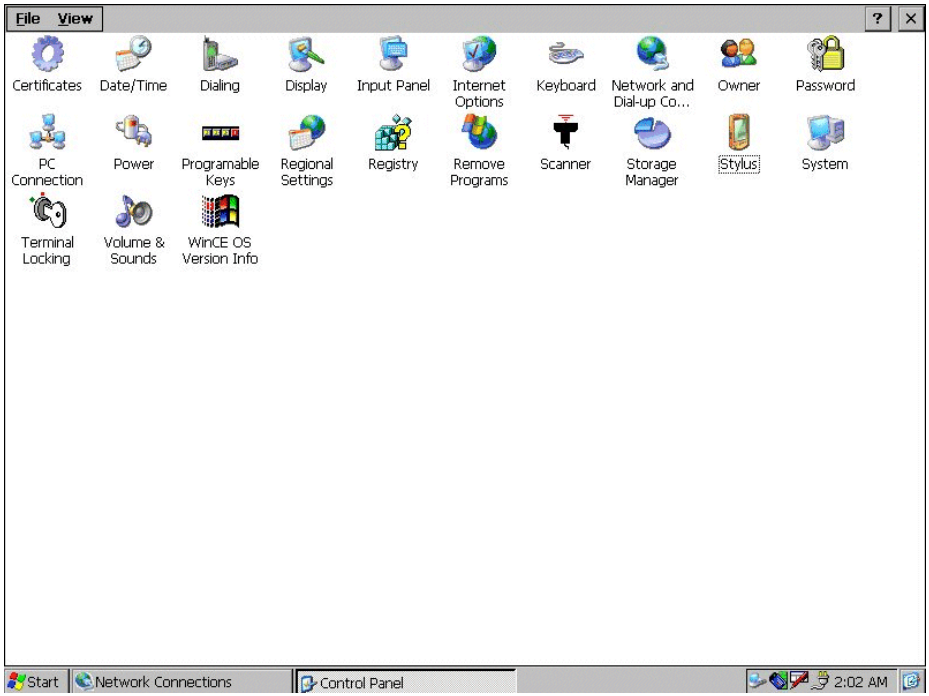


Figure 4-6. Control Panel Screen

4. Double tap the *Stylus*  icon. The *Stylus Properties* screen displays.

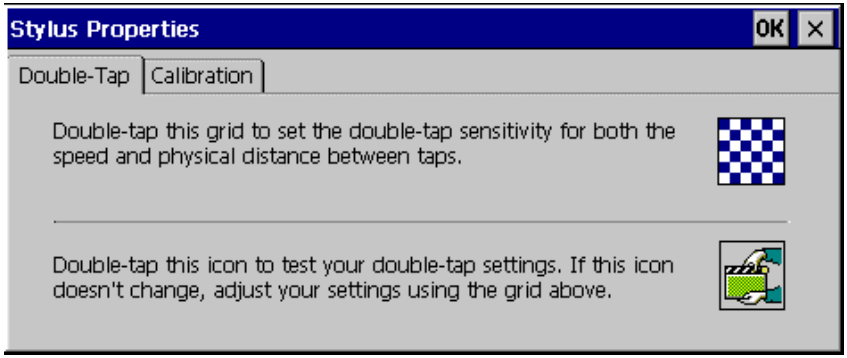


Figure 4-7. Stylus Properties Screen

5. Select the *Calibration* tab and tap the `Recalibrate` 

button. The calibration screen displays.

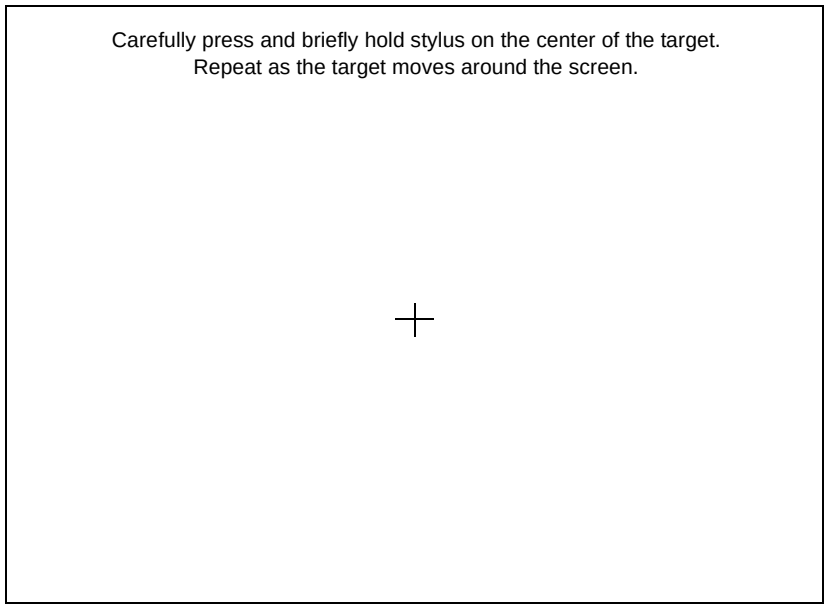


Figure 4-8. Calibration Screen

6. As the screen instructs, carefully press and briefly hold the stylus on the center of each target that appears on the screen. Repeat as the target moves around the screen.
7. Tap the screen to accept the new calibration.

Note: *If the digitizer fails to respond, call the Symbol Support Center for assistance.*

Calibrating Using the Keyboard

If the present calibration does not allow you to use the touch screen, use the keyboard to calibrate:

1. Press Ctrl + Esc keys to access the *Start* menu.
2. Using the arrow keys, select *Settings*, then *Control Panel*.

3. Press Enter to display the *Control Panel* screen.

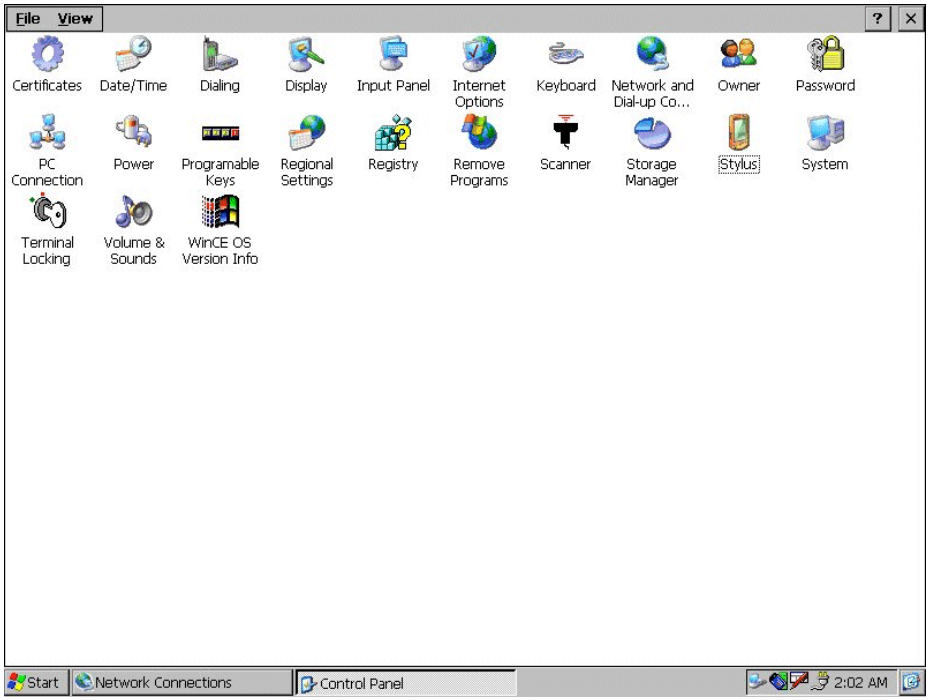


Figure 4-9. Control Panel Screen

4. Using the arrow keys, move to the *Stylus* 

icon and press Enter. The *Stylus Properties* screen appears.

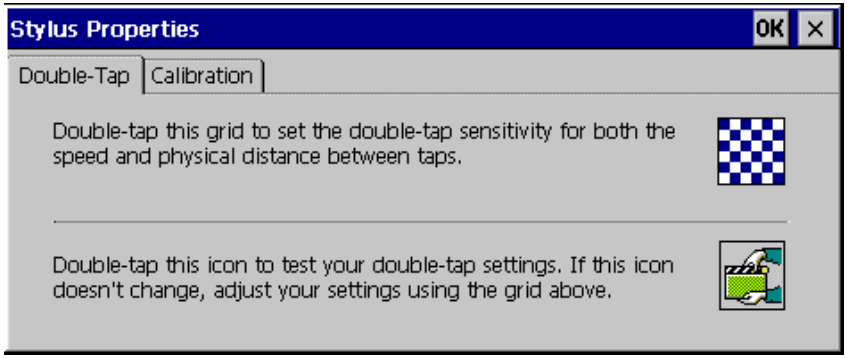


Figure 4-10. Stylus Properties Screen

5. Using the Tab key (key with double arrows), select the *Calibration* tab.

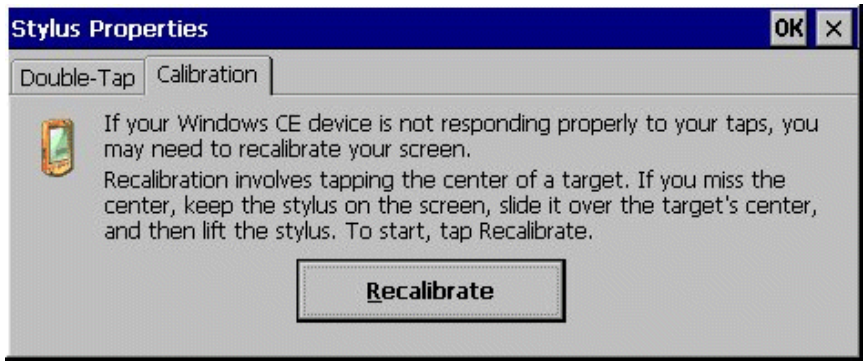


Figure 4-11. Calibration Tab

6. Using the Tab key again, select the `Recalibrate` button.
7. Press Space to start the calibration process. The calibration screen appears.

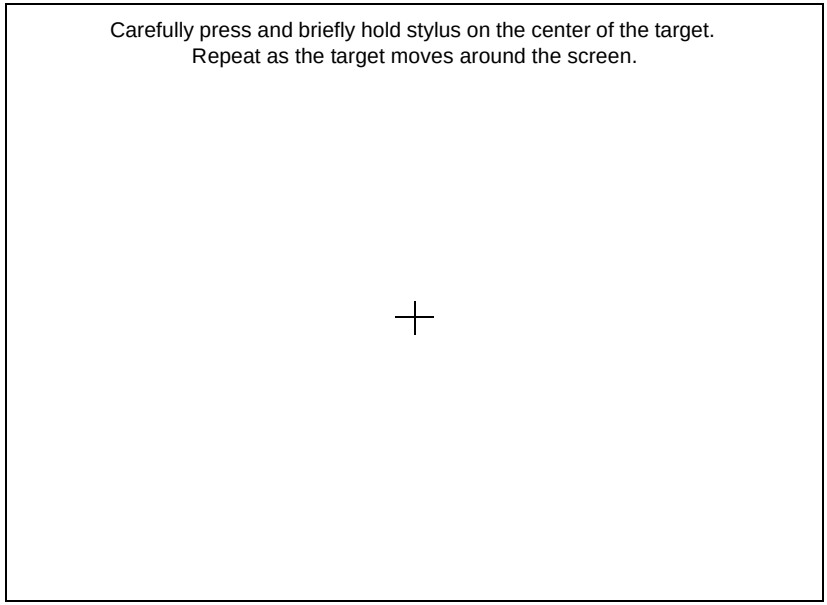


Figure 4-12. Calibration Screen

8. As the screen instructs, carefully press and briefly hold the stylus on the center of each target that appears. Repeat as the target moves around the screen.
9. Tap the screen to accept the new calibration.

Note: *If the digitizer fails to respond, call the Symbol Support Center for assistance.*

Adjusting the Brightness

Press **+** on the Brightness Control button on the membrane panel to brighten the screen, or **-** to darken it.

Adjusting the Volume

1. Tap the *Start* menu.
2. Tap *Settings*, then *Control Panel*. The *Control Panel* screen appears.
3. Double-tap the *Volume & Sounds* 

icon. The *Volume & Sounds Properties* screen appears.

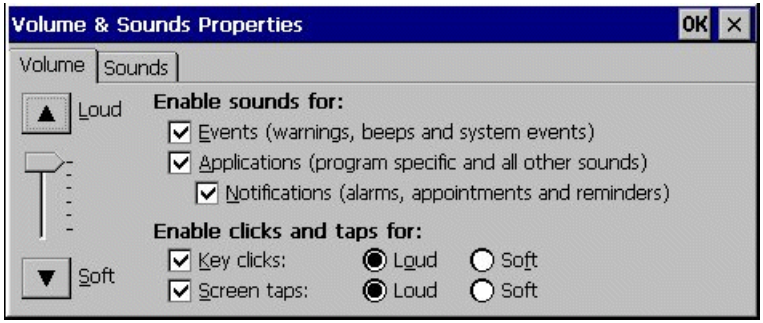


Figure 4-13. Volume and Sounds Properties Screen

4. Adjust the volume slider as necessary using the pointer or the up and down arrow keys. Check the *Enable sounds for* check boxes as desired.

Connecting Accessories

Connect an optional scanner, ActiveSync serial cable, or USB device using the appropriate port on the bottom of the VRC 89XX. All cables are available from Symbol.

You may also use the USB port for ActiveSync connection, if the COM2 port is used for another purpose. This cable is also available from Symbol.

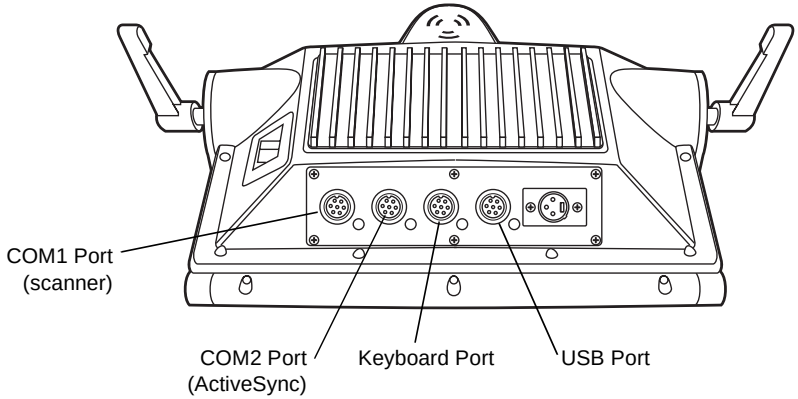


Figure 4-14. Connection Ports

Displaying Bar Code Information

The VRC 89XX contains an internal keyboard wedge that allows you to display scanned bar code information on a keyboard input application such as Microsoft Pocket Word. This feature can be used to test and evaluate scanners.

To display the bar code information on the screen:

1. Connect a scanner to the terminal.
2. Tap the *Start* menu.
3. Tap *Settings*, then *Control Panel*. The *Control Panel* screen appears.

4. Double-tap the *Scanner* 

icon. The *Scanner-As-Keyboard Properties* screen displays.

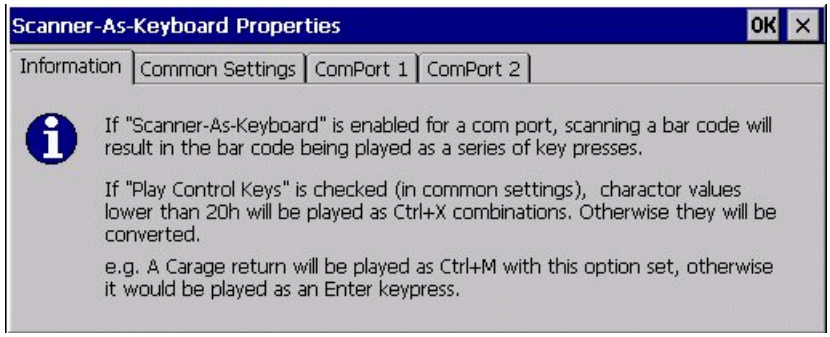
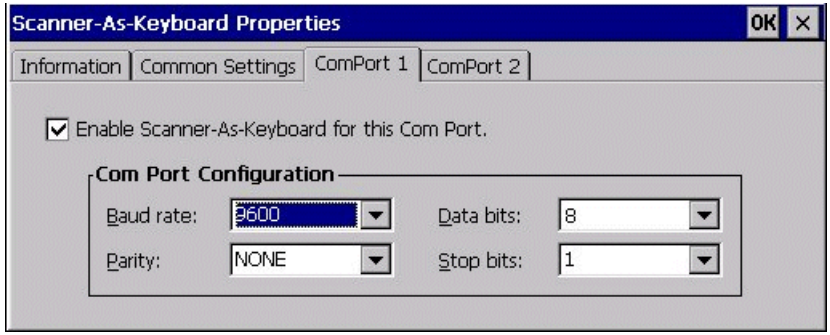


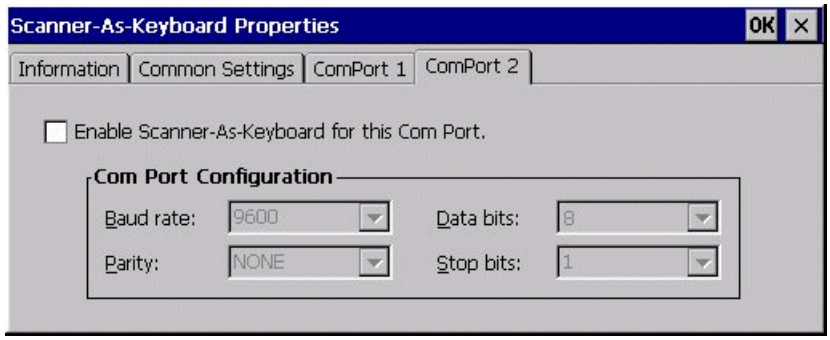
Figure 4-15. Scanner-As-Keyboard Properties Screen - Information Tab

5. Select the desired *ComPort* tab.
   a. Select the *Enable Scanner-As-Keyboard for this Com Port* checkbox to enable the built in keyboard wedge. With this setting selected, data received from the bar code scanner is treated as though it were typed on the keyboard.

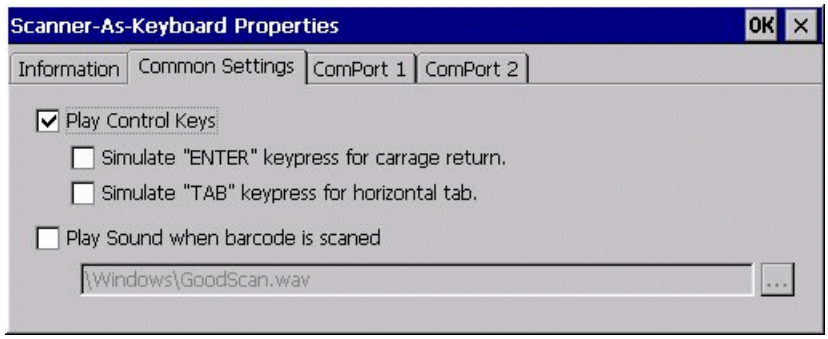


   b. Deselect the *Enable Scanner-As-Keyboard for this Com Port* checkbox to disable the built in keyboard wedge. This setting must be disabled if your

application handles the scanner serial port, or the COM1 port is used for a device other than a bar code scanner.



6. Select the *Common Settings* tab.



If the *Play Control Keys* checkbox is selected, character values lower than 20h will be played as Ctrl+X combinations. Otherwise they will be converted. For example, a carriage return will be played as a Ctrl+M with this checkbox selected, otherwise is will be played as an Enter key press.

7. Tap the *Start* menu.
8. Tap *Programs*, then *Microsoft Pocket Word* to start the application.
9. Begin scanning bar codes. The bar code information displays in Microsoft Pocket Word.

Saving Files and Allocating Memory

The terminal uses a Flash file system and a DRAM file system to save files, run applications, and allocate memory as necessary.

Flash File System

The terminal has two memory options, either 32MB or 64MB, of non-volatile Flash memory.

- The 32MB version is divided as, 20MB reserved for Windows CE .NET operating system; 11MB for storage of programs and program files (Flash file system); 1MB for storing the boot code and registry.
- The 64MB version is divided as, 20MB reserved for Windows CE .NET operating system; 43MB for storage of programs and program files (Flash file system); 1MB for storing the boot code and registry.

Permanently save your files and programs to Flash by moving them to the following folders in '\FlashFx Disk\':

- \ActiveX - ActiveX controls placed in this folder are registered on start up.
- \CopyToRam - the following folders are available:
  - \Root - applications or files placed in this folder are copied to the root directory.
  - \Startup - applications placed in this folder are permanently stored in Flash but copied to DRAM and executed on start up.
  - \System - applications or data placed in this folder are permanently stored in Flash but copied to the \Windows folder in DRAM on start up.
  - \User - user application files.
  - \CAB - CAB installation files are placed into this folder.

DRAM File System

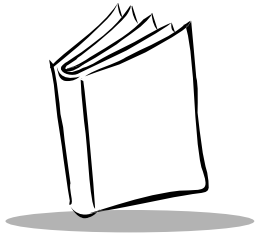
The terminal contains 32MB or 64MB of DRAM backed up by the internal battery for 72 hours. The Windows CE .NET operating system, along with applications in the \CopyToRam directory, is copied from Flash to DRAM and runs from DRAM when you boot the terminal.

The DRAM contains the desktop, user settings, and registry. If this information is lost due to a cold boot or complete discharge of the internal battery, default data is loaded from Flash on the next start up.

To boot up using the default registry in RAM:

1. With the terminal in suspend mode, hold down the P1 + P3 + Suspend buttons.
2. Release only the Suspend button when the terminal powers up.
3. Release P1 + P3 when the Boot Loader menu displays.
4. Select `Use Default Registry` from the menu.

You can change the allocation of remaining memory for programs and storage using the Control Panel. Open the *System* menu and tap the *Memory* tab. The recommended setting is 50% of memory available for programs and 50% of memory available for storage. If your applications require more program space, more storage space, or you receive a memory warning, adjust the percentages as necessary.



Chapter 5
Spectrum24 Network Configuration

Introduction

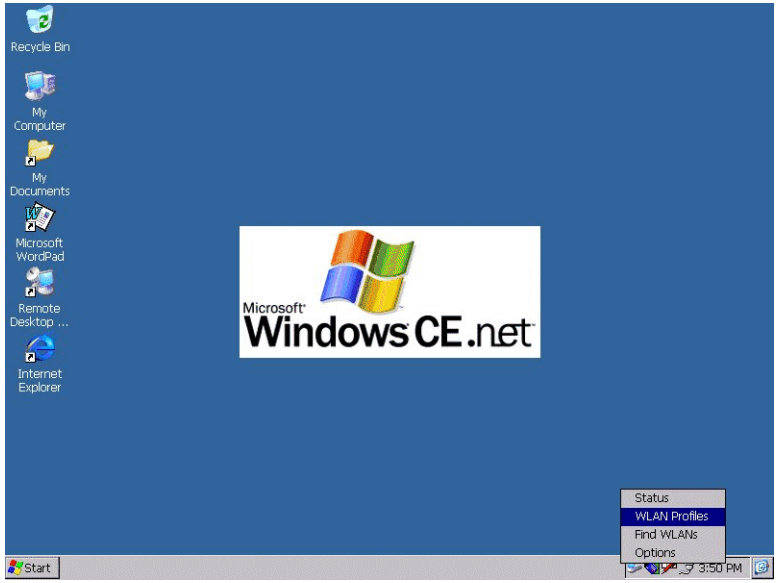
In order to use Symbol's Spectrum24 wireless LAN on the VRC 89XX terminals, the terminal must be properly configured with the correct ESS ID and other network entries. This chapter describes how to configure your terminal on the Spectrum24 wireless network.

Note: *There are currently no Windows CE .NET network drivers available for a 2Mbps radio. Therefore, only configuration of 11Mbps is described in this chapter.*

Configuring Your 11 Mbps Terminal

To configure the terminal for use on the Spectrum24 wireless network:

1. Tap the *NICTT* icon located on the bottom of the screen.



2. Tap *WLAN profiles*. The *Mobile Companion - WLAN Profiles* window opens.

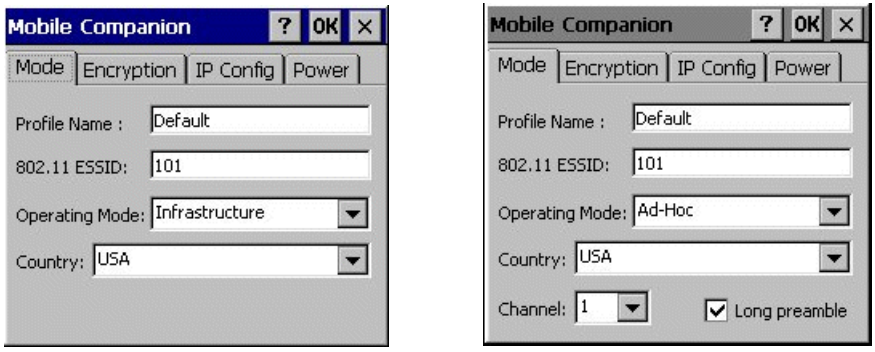
3. Select the desired access point and tap **Edit**.
4. Configure the settings in each of the tabs. Details for each tab are described in *WLAN Profiles Tabs* on page 5-3.

5. Once all settings have been configured, tap **OK**.
6. Tap the *NICTT* icon located on the bottom of the screen and select *Status*. The *Mobile Companion* window opens, consisting of five tabs - Signal, Info, IP Status, Ping and APs. Details for each tab are described in *Status Tabs* on page 5-9.

WLAN Profiles Tabs

Mode Tab

The *Mode* tab configures the adapter's ESSID and operating mode.



Infrastructure Mode

Ad Hoc Mode

Figure 5-1. Mode Tab

- Use the *Profile Name:* field to enter the name of the mobile computer profile used to transmit with either an AP or another networked computer.
- Use the *802.11 ESSID:* field to enter the (WLAN) identifier of the network connection. The ESSID is the 802.11 Extended Service Set Identifier. The ESSID is a 32-character (maximum) string identifying the WLAN. The ESSID assigned to the mobile computer is required to match the AP ESSID for the mobile computer to communicate with the AP.
- Use the *Operating Mode:* drop-down list to select the operating mode.
  - Select *Infrastructure* to enable the mobile computer to transmit and receive data with an AP. If you select this, enter a 32-character maximum ESSID in the *802.11 ESSID* field to identify the wireless local area network. This ESSID must match the access point ESSID for the adapter to communicate with the access point. Infrastructure is the mobile computer default mode when Mobile

Companion initially appears.

- Select Ad Hoc to enable the mobile computer to form its own local network where mobile computers communicate peer-to-peer without APs using a shared ESSID. If you select this, enter a 32-character maximum ESSID in the *802.11 ESSID* field to identify the wireless local area network. This ESSID must match the ESSID of other devices using the Ad Hoc mode.
  Enter the channel number in the *Channel* field. The first adapter configured in the Ad Hoc network defines the channel number used in the Ad Hoc network. Each adapter is required to use the same channel to transmit and receive data to its peers.
  Select the *Long Preamble* checkbox if the other devices in your network are using a long preamble. Devices using Ad Hoc mode must use the same preamble setting to interoperate. The adapter uses a long preamble heading by default.
- Use the *Country:* drop-down list to select the country of operation for the mobile computer. This ensures the mobile computer is using country code information compatible with the country code data used by the associated AP. Select *International* if using the mobile computer with a non-Symbol AP or a pre AP-4131 model.

Encryption Tab

The *Encryption* tab controls encryption options. This allows you to encrypt WLAN data packets to protect your data from inspection by systems that may intercept wireless data over the network.

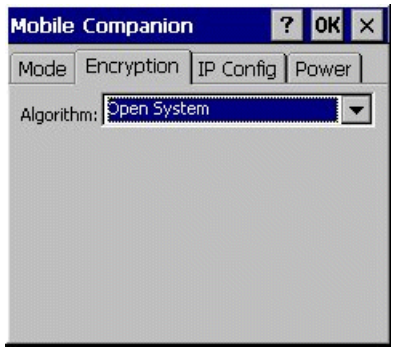


Figure 5-2. Encryption Tab - Open System

- Use the *Algorithm:* drop-down list to select an encryption algorithm that matches the security established in your network. The AP and the terminal's adapter must use the same encryption.
  - The *Open System* does not encrypt any of the data packets that travel over the WLAN, meaning the data packets transmitted by terminals or APs are not encrypted. Select this if no security is needed on the network.
  - The *40-bit Shared Key* algorithm uses a 40-bit encryption key known by both the terminal and the AP to encrypt the data over the network.

Figure 5-3. Encryption Tab - 40-bit Shared Key

  - The *128-bit Shared Key* algorithm uses a 128-bit encryption key known by both the terminal and the AP to encrypt the data over the network. This option provides a higher level of security than the 40-bit encryption while maintaining an 11 Mbps data rate.

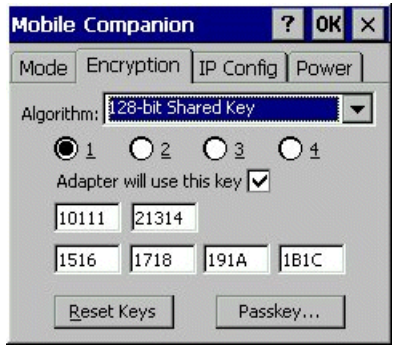


Figure 5-4. Encryption Tab - 128-bit Shared Key

- Select *Kerberos* if your network employs the Kerberos system. Enter the KDC and Realm values. The KDC is located on a server and maintains information about the access points and users it supports, and also permits the transmission and receipt of data once the credentials of the user are verified. Enter the name of the server that hosts the Kerberos KDC in the Realm field.

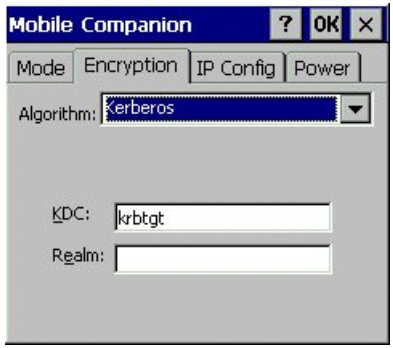


Figure 5-5. Encryption Tab - Kerberos

- Selecting *LEAP* from the drop-down box disables WEP automatically. All necessary infrastructure devices (for example, access points, servers, etc.) must be properly configured for LEAP authentication.

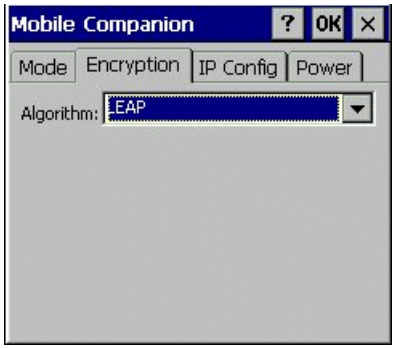
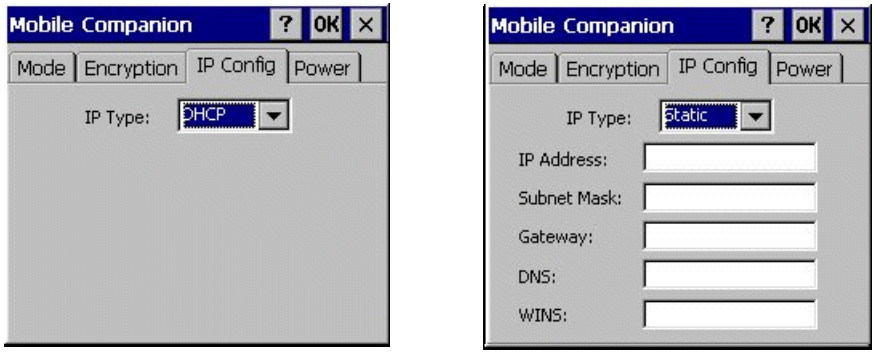


Figure 5-6. Encryption Tab - LEAP

IP ConfigTab

The *IP Config* tab allows you to adjust IP configuration settings.



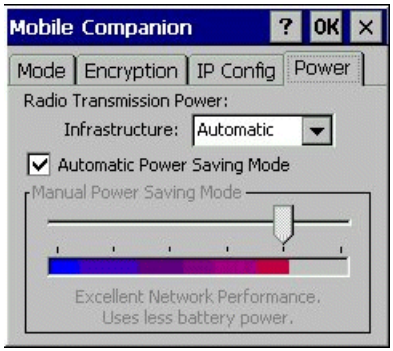
DHCP Static

Figure 5-7. IP Config Tab

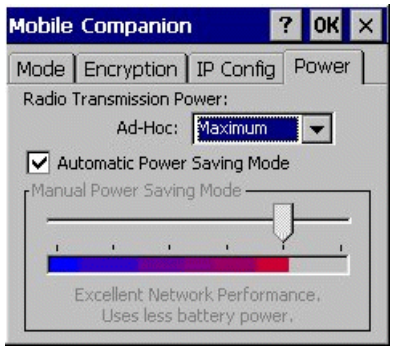
- Select Dynamic Host Configuration Protocol (*DHCP*) from the *IP Type* drop-down list to obtain a leased IP address and network configuration information from a remote server. DHCP is the default setting for the terminal profile. When DHCP is selected, the IP address fields are read-only.
- Select *Static* to manually assign the IP, subnet mask, default gateway, DNS and WINS addresses used by the terminal profile.
  - *IP Address*: Enter an IP (Internet Protocol) address in dotted-decimal notation (e.g., 192.168.7.27) that the server uses to transmit and receive data.
  - *Subnet Mask*: Required in order for the subnet to exist. Its purpose is to mask out IP addresses that are not part of the subnet. The network administrator usually has the required subnet mask.
  - *Default Gateway*: Used to connect to the corporate network. The network administrator usually has the IP address required for the default gateway.
  - *DNS* (Domain Name System): The IP address of a server containing a database of host names and their associated IP addresses so that when a host name is used, it can be resolved into its IP address.
  - *WINS* (Windows Internet Name Service): A NetBIOS Name Server that registers your NetBIOS names and resolves into IP addresses, similar to DNS.

PowerTab

The *IP Config* tab allows you to set the *Radio Transmission Power* level and the *Power Saving Modes* for the terminal profile.



Infrastructure Mode



Ad Hoc Mode

Figure 5-8. Power Tab

Adjusting the *Radio Transmission Power* level enables you to expand or confine the transmission area with respect to other wireless devices that could be operating nearby. Reducing a coverage area in high traffic areas improves transmission quality by reducing the number of noises in that coverage area.

- In Infrastructure mode there are two transmission power options:
  - Select *Automatic* to use the AP power level. Automatic is the default mode for terminals operating in Infrastructure mode.
  - Select *Power Plus* to set the terminal transmission power one level higher than the level set for the AP.
- In Ad Hoc mode there are five transmission power options:
  - Select *Maximum* power to set the terminal to the highest transmission power level. Select Maximum power when operating in highly reflective environments and areas where other devices could be operating nearby. Additionally, use the maximum power level when attempting to communicate with devices at the outer edge of a coverage area.
  - Select *50%*, *25%* or *10%* to set the transmit power level to that percentage of the maximum power level.
  - Select *Minimum* power to set the terminal to the lowest transmission power level. Use the minimum power level when communicating with other devices in

very close proximity. Additionally, select minimum Spectrum24 Network Configuration power in instances where little or no radio interference from other devices is anticipated.

The *Automatic Power Saving Mode* switches to *Best Network Performance* when an AC power supply is detected. If a battery is used, an appropriate setting between *Best Network Performance* and *Acceptable Network Performance* is automatically chosen based on a real-time analysis of network usage. The *Automatic Power Saving Mode* is the default setting and extends the operating time before the battery is recharged.

The *Manual Power Saving Mode* allows you to select a performance level suited to intended operation. There are six settings ranging from the *Best Network Performance* (using the most battery power) to *Acceptable Network Performance* (using the least battery power). A network performance description is displayed for each power range.

Status Tabs

Signal Tab

Use the *Signal* tab to display a real-time graph of the signal quality of the adapter to the associated access point, including the number of times the adapter has roamed to and from APs, the current data rate, and the network status. Signal quality indicates how clearly the adapter can "hear" the associated access point.

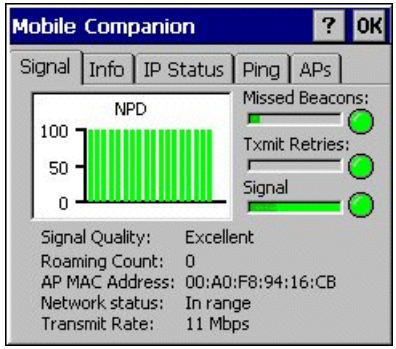


Figure 5-9. *Signal* Tab

Note: *The Signal tab is only available in Infrastructure mode (selected on the Mode tab).*

Info Tab

The *Info* tab provides information about the terminal, such as firmware and hardware versions, adapter type, and operating mode.

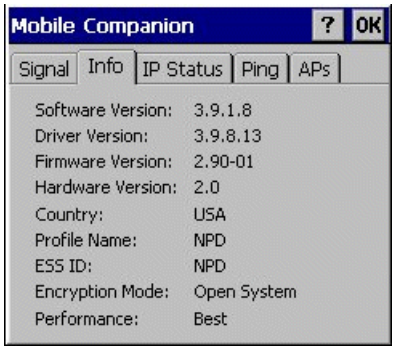


Figure 5-10. *Info* Tab

IP Status Tab

The *IP Status* tab in NICTT provides information about the terminal, such as IP type and IP address, Subnet Mask and Gateway.

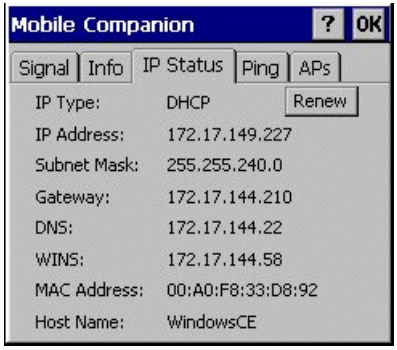


Figure 5-11. *IP Status* Tab

- **IP Address**: A 32-bit (max) number (expressed in dotted-decimal notation 157.235.90.24) that the Domain server uses to transmit and receive data. The IP address of the adapter is required to be in the same subnet as that of the access point for the devices to interoperate in Infrastructure mode.

- **Subnet Mask**: Most TCP/IP networks use subnets to manage routed IP addresses. This allows the network to connect to the Internet with a single shared network address, e.g., 255.255.255.0.
- **Default Gateway**: Used to forward IP packets to and from a remote destination. See your network administrator for the IP address required for the default gateway.
- **DNS** (Domain Name System): The IP address of a server containing a database of host names and their associated IP addresses so that when a host name is used, it can be resolved into its IP address.
- **WINS** (Windows Internet Name Service): A NetBIOS Name Server that registers your NetBIOS names and resolves into IP addresses, similar to DNS.
- **MAC Address**: An IEEE 48-bit address the adapter is given at the factory which uniquely identifies the adapter at the physical layer level.
- **Host Name**: User-assigned host name.

Ping Tab

Use the *Ping* tab to send and receive ICMP ping packets across the network to the specified IP address.

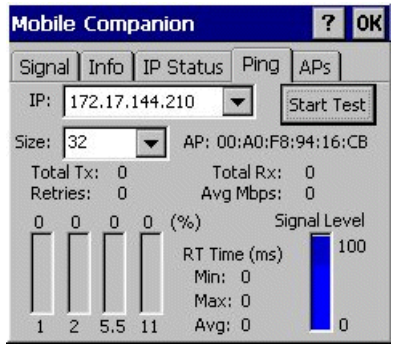


Figure 5-12. *Ping* Tab

Note: *The Ping tab is only available in Infrastructure mode (selected on the Mode tab).*

To send a ping:

1. Enter an IP address as a dotted string (e.g., 122.78.3.141) in the *IP:* text box. .

2. Select the size of packets sent from the *Size* drop-down list.
3. Tap **Start Test** to begin the continuous ping test. Tap **Stop Test** to terminate the ping test.
   - The average mega-bits per second, signal strength, data rate currently in use, test statistics and round trip times are displayed for each test.
   - The associated access point's MAC address is also displayed.
   - The signal strength level and the data transmission rate are displayed in real-time bar graphs.

APs Tab

Use the *APs* tab to view access points with the same ESSID as the adapter. View the AP MAC address, signal level and channel of known access points.

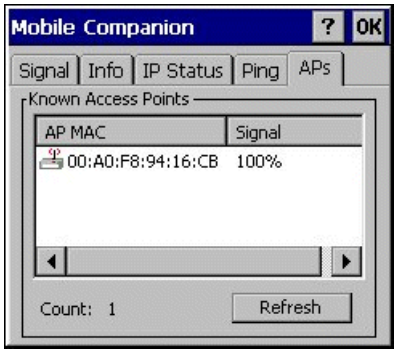


Figure 5-13. *APs* Tab

Note: *The APs tab is only available in Infrastructure mode (selected on the Mode tab).*

- The currently associated access point's icon includes a radio wave radiating from the antennae to indicate the associate status. Tap on an icon to display a menu:
  - Select *Set Mandatory* to prohibit the adapter from associating with a different access point. The letter "m" displays on top of the access point's icon when this option is selected.
  - Select *Set Roaming* to allow the adapter to roam to any access point with a better signal quality.

  These settings are temporary and are not saved to the registry.

- Tap the `Refresh` button to update the list of the known APs.

Peers Tab

Use the *Peers* tab to to display the BSSID or MAC addresses of the other terminals in the network, their operating mode (PSP or CAM), their transmit rate, their supported data rate and the length of time an adapter has been out of the Ad Hoc network. Tap Refresh to update the Peers tab to the latest Ad Hoc network performance and terminal membership data.

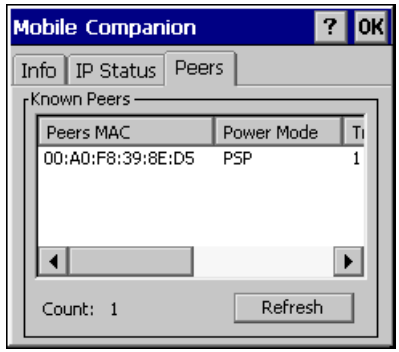


Figure 5-14. *Peers* Tab

Note: *The Peers tab is only available in Ad Hoc mode (selected on the Mode tab).*

Options Tab

Use the *Options* tab to enable or disable the suspend wireless network option and system sounds, and set temporary settings.

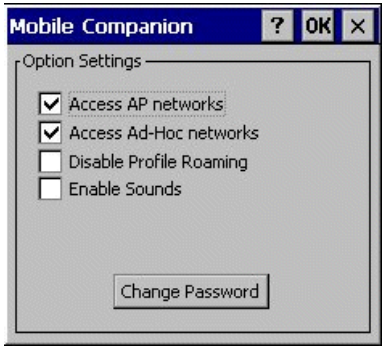
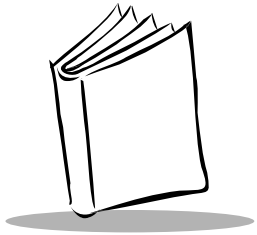


Figure 5-15. *Options* Tab

- Select the *Access AP networks* checkbox to enable and disable access to AP networks
- Select the *Access Ad-Hoc networks* checkbox to enable and disable access to Ad-Hoc networks
- Select the *Disable Profile Roaming* checkbox to enable and disable profile roaming
- Select the *Enable Sounds* checkbox to enable and disable sounds
- **Change Password** allows the system administrator to set a password for the WLAN profiles, this will stop unauthorised personnel from changing the WLAN settings.



Chapter 6
Configuring the Terminal

Introduction

This chapter describes the terminal's Flash partitions and how they are used to specify and load files into the Flash memory of the terminal using ActiveSync.

Flash Partitions

In addition to the RAM-based storage standard on Windows CE .NET terminals, the VRC 89XX is equipped with a non-volatile Flash-based storage area which can store data (partitions) that cannot be corrupted by a cold boot. This Flash area is divided into two categories: Flash File System (FFS) Partitions and Non-FFS Partitions.

FFS Partitions

The terminal includes one FFS partition. This partition appears to the terminal as a hard drive that the OS file system can write files to and read files from. Data is retained even if power is removed.

The FFS Partition is used to store application programs needed to operate the terminal. This partition is also available for user data files generated by your custom programs.

The partition contains one volume with the folder CopyToRAM, which contains the following subfolders:

CopyToRAM	User application files which need to be loaded into RAM prior to execution
\Root	applications or files placed in this folder are copied to the root directory while maintaining their directory structure
\Startup	applications placed in this folder are permanently stored in Flash but copied to DRAM and executed on start up
\System	applications or data placed in this folder are permanently stored in Flash but copied to the \Windows folder in DRAM upon cold/warm boot
\User	User application files
\CAB	CAB installation files are placed into this folder.

Non-FFS Partitions

Non-FFS Partitions include software and data pre-loaded on your terminal. Unlike the FFS Partition, these partitions are not visible when the operating system is running. They also contain system information. Non-FFS Partitions include the following:

- Windows CE .NET: the complete Windows CE .NET operating system is stored on Flash devices. If necessary, the entire OS image may be downloaded to the terminal using files provided by Symbol. Any upgrades must be obtained from Symbol. This partition is mandatory for the VRC 89XX.
- Boot Loader: initializes the CE .NET operating system prior to starting CE .NET and provides a simple method of updating the Flash contents via a serial port.

Downloading the Operating System by Serial Bootcode

To download the operating system via the serial port, the following equipment is required:

- PC
- ActiveSync cable
- The VRC8900 CE .NET update program available on the *Windows CE .NET v4.1 Software User Upgrade Kit for Symbol VRC 79XX/VRC 89XX Terminals* CD or downloadable from Microlise's website, http://www.microlise.com/VRC8900.

Note: *The Microlise website is password protected. Use the Windows CE .NET license key information, as it appears on the Microsoft .NET license label on your terminal, to gain access to the website.*

1. Connect the ActiveSync cable to the COM1 port on the terminal and an available COM port on the PC.
2. Power on the unit while holding down the P1 and P3 keys. The following menu appears:

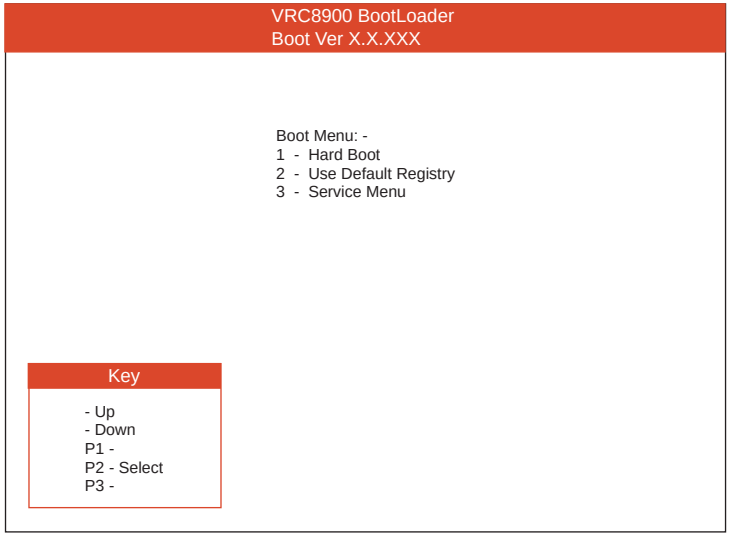


Figure 6-1. Menu

3. Press the Brightness "-" (minus) button on the switch panel to highlight *3 - Service Menu*.

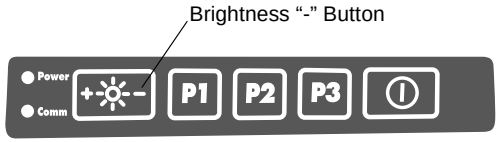


Figure 6-2. Brightness Button

Press the P2 button. The following menu appears.

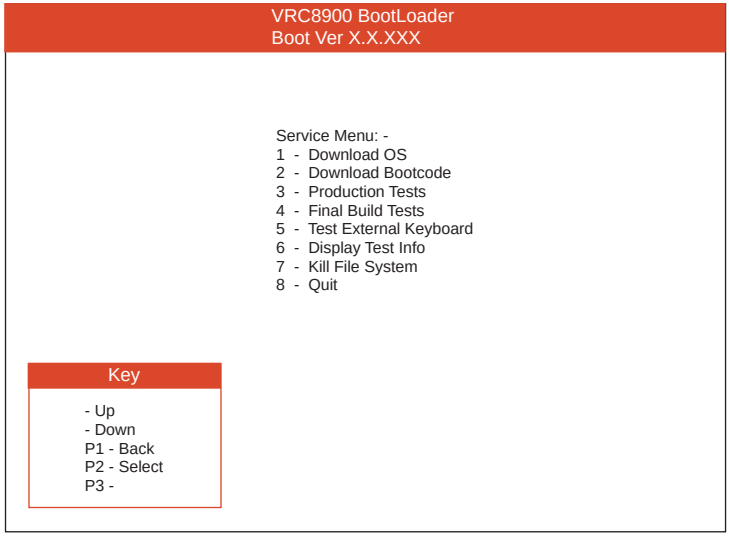


Figure 6-3. Service Menu

4. Press the P2 button to select *1 - Download OS*. The following screen appears.

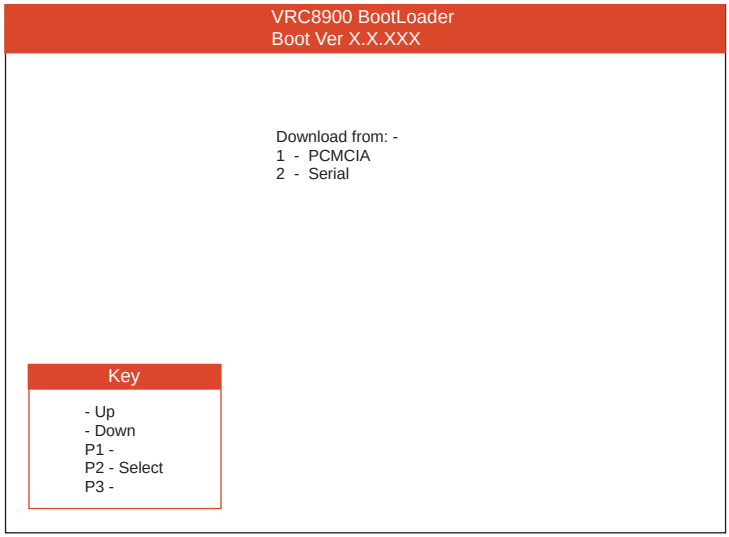


Figure 6-4. Download Menu

5. Press the Brightness “-” (minus) button on the switch panel to highlight *2 - Serial*. Press the P2 button to select this.
6. Select option 3 (115200) on the VRC8900 to initiate the download.Before pressing P2 to initiate the download setup the PC from step 7.

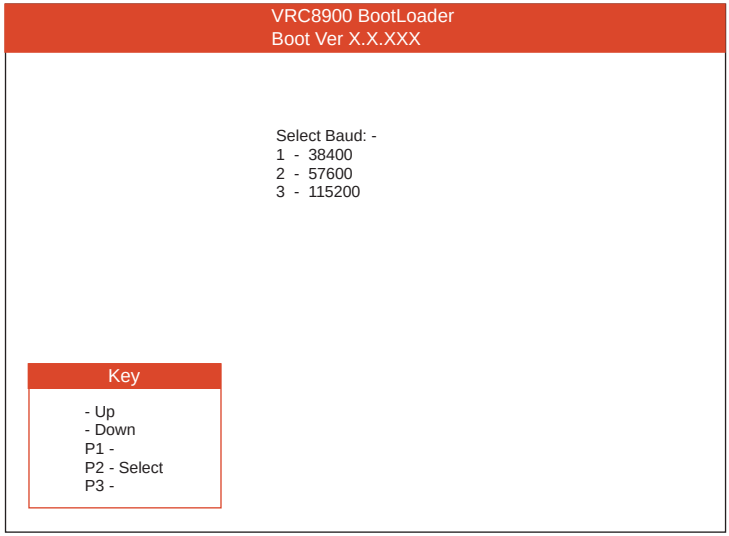


Figure 6-5. Baud Rate

7. Set up the desktop PC as follows:

a. Start the program OSUPDATE.EXE. The following screen appears:

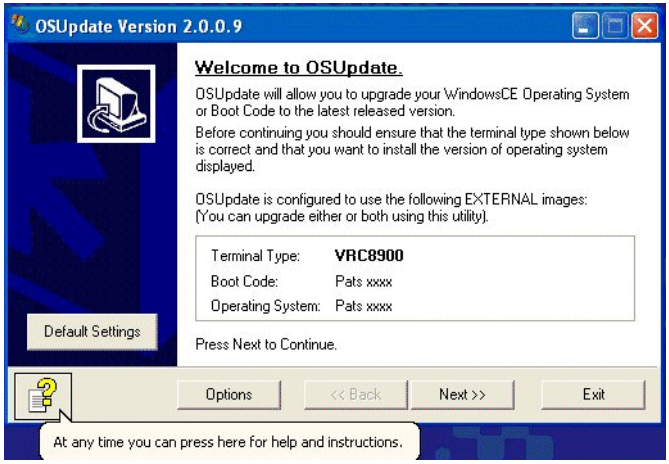


Figure 6-6. OSUpdate Screen

b. Click **Next**.

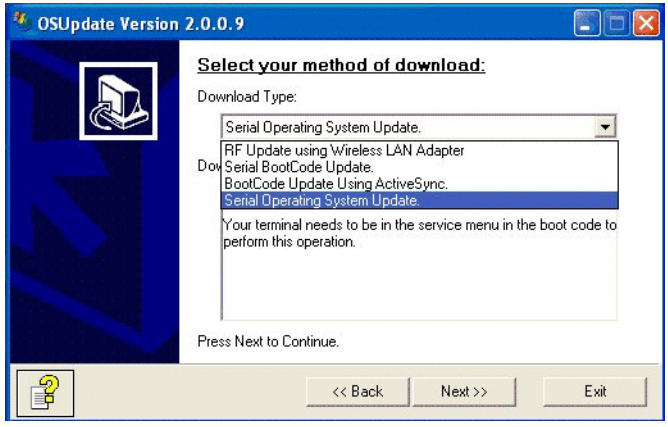


Figure 6-7. Download Type

c. Select *Serial Operating System Update* from the Download Type drop-down list.

d. Click **Next**.

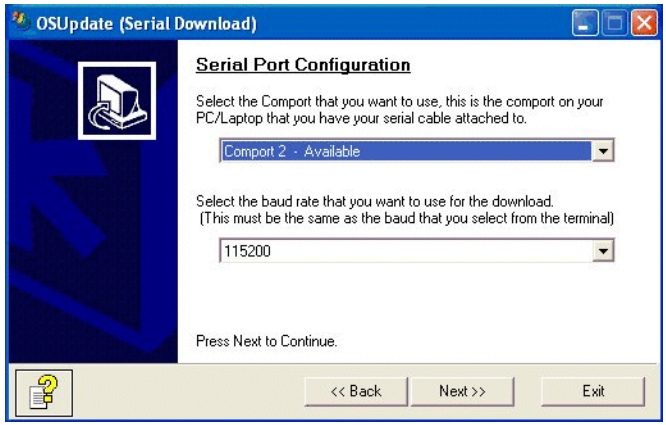


Figure 6-8. Serial Port Configuration

e. Select the Comport that you want to use, this is the comport on you PC/Laptop that you have your serial cable attached to.

f. Select the Baud rate that you want to use for the download. This must be the same as the baud that you select from the terminal.

g. Click **Next** .

8. Press P2 on the terminal to start the download process.

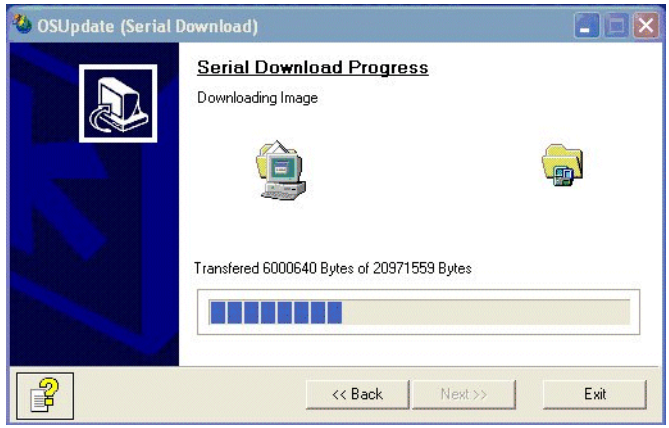


Figure 6-9. Serial Download Progress

It takes approximately 30 minutes to download a 20Mb file.

9. When the download is complete a message appears on the VRC 89XX asking if the upload version should replace the existing version. Use the Brightness “+” and Brightness “-” buttons on the panel to toggle between Yes and No.
   If you select Brightness “+” (Yes), the VRC 89XX checks the CRC of the downloaded operating system before transferring it from SDRAM to Flash memory. DO NOT switch off the terminal before this transfer is complete or the Flash memory will only contain part of the operating system and you must download again.
10. When complete, you are prompted to restart the terminal. Restart the VRC 89XX. The new operating system takes effect.

Downloading the Operating System by RF Update

The WLAN update allows both the boot code and the operating system to be upgraded via the WLAN card fitted to the unit.To download the operating system via a WLAN card, the following equipment is required:

- A Networked PC Running Microsoft Windows 95 or later
- Unit with 2/11mbps WLAN card installed
- Compatible Access Point
- WLAN Update installed on the device.

Setting up the Host Computer

1. Verify that OSUpdate is installed on the host computer. If not, it is available on the *Windows CE .NET v4.1 Software User Upgrade Kit for Symbol VRC 79XX/VRC 89XX Terminals* CD or downloadable from Microlise’s website, http://www.microlise.com/VRC8900.

Note: *The Microlise website is password protected. Use the Windows CE .NET license key information, as it appears on the Microsoft .NET license label on your terminal, to gain access to the website.*

---

2. Launch OSUpdate on the host computer. The *Welcome to OSUpdate* screen displays. Confirm that you are downloading the correct Boot Code and Operating

System for your terminal by ensuring that the Terminal Type displayed on the screen matches your terminal.

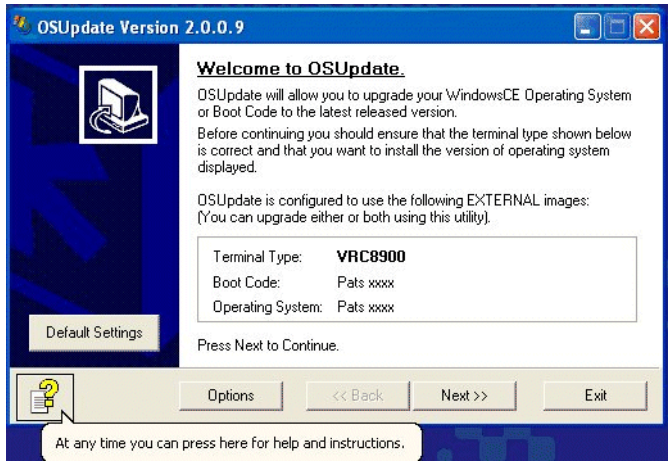


Figure 6-10. OSUpdate Screen

3. If the screen displays the correct information, click **Next**.The following screen displays.

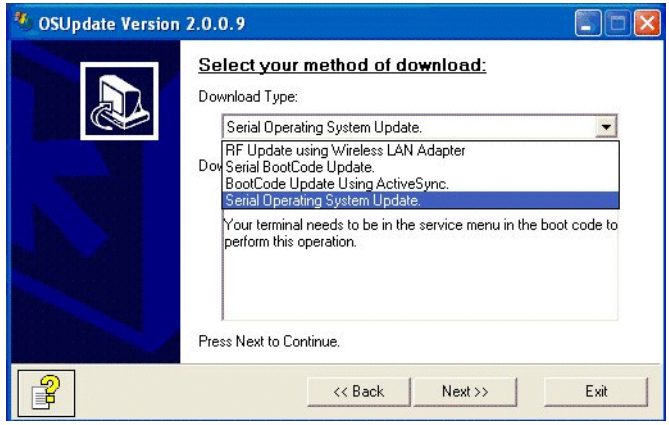


Figure 6-11. Download Type

If the OSUpdate screen displays the incorrect information, click **Options** to load a different Boot Code and Operating System.

4. Select *RF Update using Wireless LAN Adapter* from the Download Type drop-down list.
5. Click **Next**. OSUpdate will initialize itself and listen for requests from terminals.

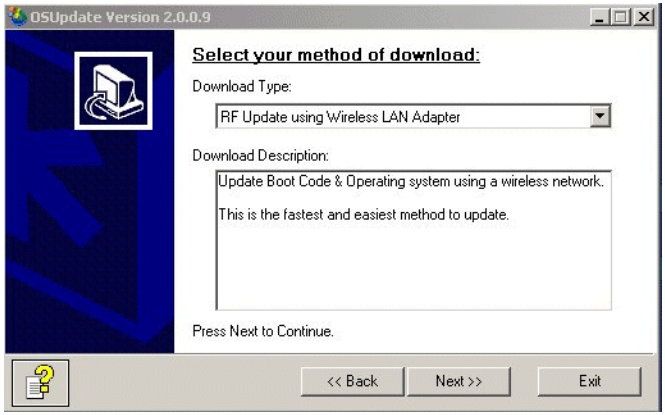


Figure 6-12. RF Download Progress

6. Setup up your terminal.

Setting up the Terminal and Upgrading the OS

1. With OSUpdate waiting for an incoming connection, execute WLANUpdate on the terminal. The *Terminal Information* screen displays.

Note: *If installed, WLANUpdate can be found in \Windows\WLANUpdate.exe.*
If not installed, see installation instruction on page 6-13. .

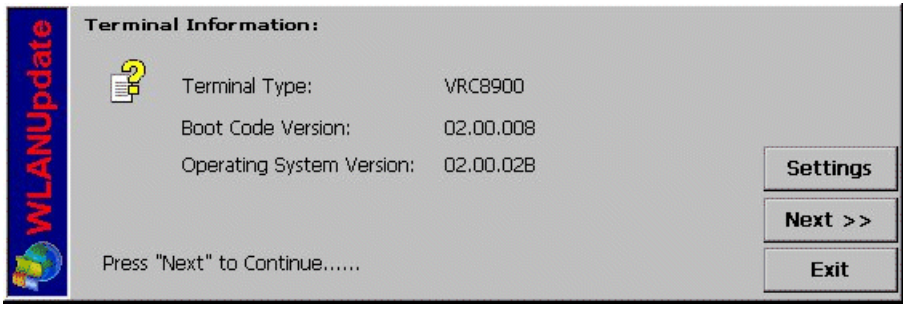


Figure 6-13. Terminal Information Screen

2. Tap **Next**.
3. WLANUpdate searches for active OSUpdate Servers that have the right operating system and Boot Code for the terminal and creates a list in the screen, as shown below:

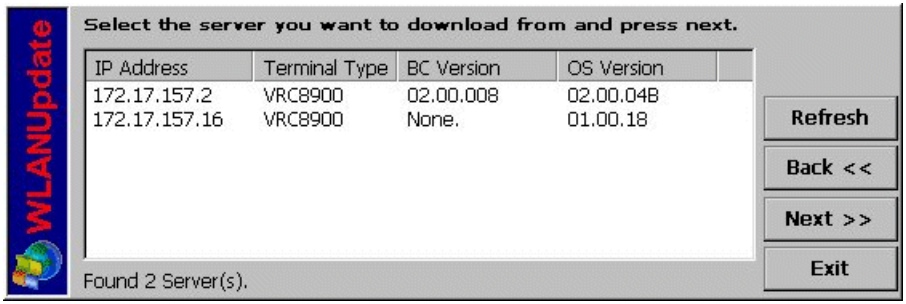


Figure 6-14. List of OSUpdate Servers

If the WLANUpdate fails to find an OSUpdate server, the following screen displays:

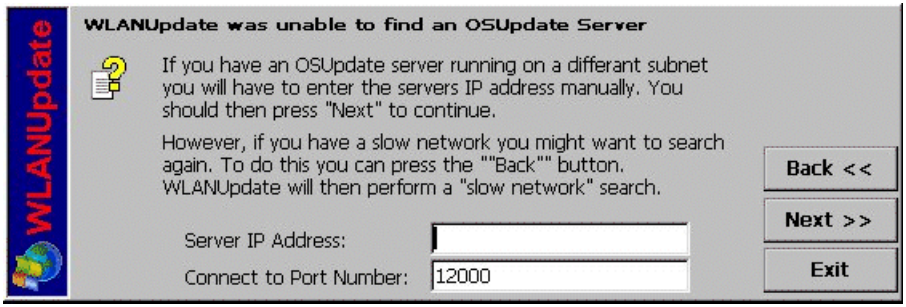


Figure 6-15. WLANUpdate Unable to Finf Server

This could happen for one of the following reasons:

- OSUpdate is running on a slow network and did not respond quickly enough. Tap **Back**. This will make WLANUpdate perform a 'slow network' search. If no server is found again, the above screen displays again. Otherwise the screen shown in Figure 6-14 displays.
- OSUpdate is running on a different subnet to your terminal. WLANUpdate will be unable to automatically locate your OSUpdate server. To continue, manually

enter the IP address and port number of the host computer running OSUpdate.

- Ensure that the ESSID on your terminal is correct for the RF network and ensure the WEP encryption is correct, if applicable.

4. From the list of OSUpdate Servers, select the server you want to download from. You can download the Boot Code and the Operating System at the same time or just one at a time.
5. Tap **Next**. The *Download Settings* screen displays.

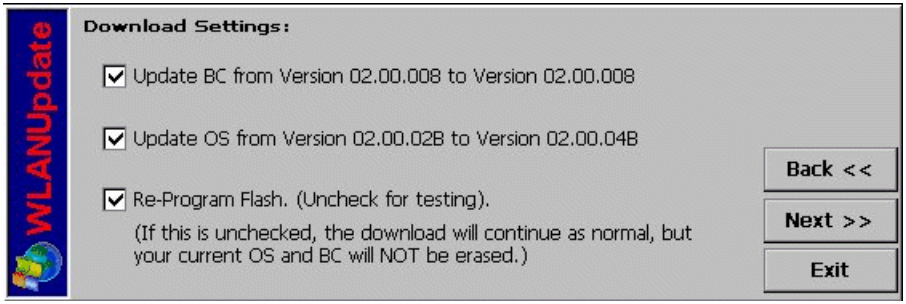


Figure 6-16. Download Settings

6. Configure the download settings.
   a. Select the first checkbox to update the boot code only.
   b. Select the second checkbox to update the operating system only.
   c. Select the third checkbox to re-program the flash. If this checkbox is unchecked, WLANUpdate performs a test download and the current boot code and operating system is not changed.
7. Tap Next. The *Download Progress* screen displays.

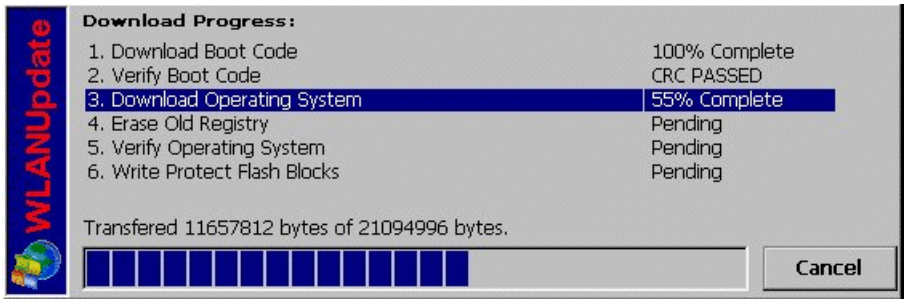


Figure 6-17. Download Progress

You can cancel a download at any time. However, if you cancel a download part way through your current operating system and boot code may get damaged and the terminal will not be able to restart until a full download is performed.

8. Once download is complete, a pop-up dialog box asks whether you want to restart your terminal. If a new operating system was downloaded, you should restart your terminals.

Figure 6-18. Restart Dialog Box

9. Tap **Yes** to restart the terminal.

Installing WLANUpdate with ActiveSync

1. Connect the ActiveSync cable to the appropriate port on the host computer.
2. Ensure that the latest ActiveSync software is installed on your host computer. If not, it is available on the *Windows CE .NET v4.1 Software User Upgrade Kit for Symbol VRC 79XX/VRC 89XX Terminals* CD or downloadable from Microsoft's web site at http://www.microsoft.com.

3. Launch ActiveSync on the host computer. The *Get Connected* dialog box displays.

Figure 6-19. Get Connected

4. When prompted with the *Get Connected* dialog box, connect the ActiveSync cable to the appropriate port on the terminal and click **Next**. The *Set Up a Partnership* dialog box displays.

Figure 6-20. Set Up a Partnership

5. Select the *No* checkbox and click **Next**. The host computer and the terminal are connected.
6. Locate WLANUpdate on your host computer. It is available on the *Windows CE .NET v4.1 Software User Upgrade Kit for Symbol VRC 79XX/VRC 89XX Terminals* CD or downloadable from Microlise's website, http://www.microlise.com/VRC8900.

Note: *The Microlise website is password protected. Use the Windows CE .NET license key information, as it appears on the Microsoft .NET license label on your terminal, to gain access to the website.*

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7. Launch WIndows Explorer and copy the WLANUpdate.exe (downloaded in the previous step) and paste it in the Mobile Device\My Computer\Temp folder.
8. WLANUpdate is now installed on your terminal.

Downloading Applications

To download an application via the serial port, the following equipment is required:

- Desktop PC
- ActiveSync cable
- Application compiled for the VRC 89XX, or installation file for PC
- Microsoft ActiveSync installed and configured on the desktop PC.

To download an application compiled for the VRC 89XX:

1. Connect the ActiveSync cable to the COM2 port of the terminal and an available COM port on the desktop PC.
   The terminal automatically connects to the desktop PC. After synchronization

between the terminal and the PC is established, the following screen displays on the PC:

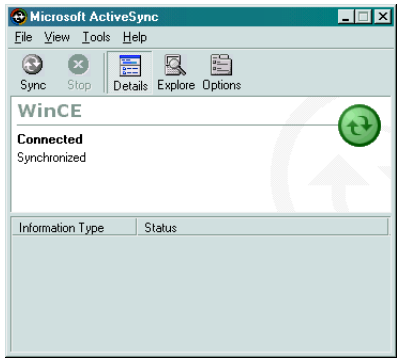


Figure 6-21. ActiveSync Connection Screen

2. Click the `Explore` button to display the desktop of the terminal in another screen as follows:

Figure 6-22. Mobile Device Screen

Double-click `My Computer` to view RAM and Flash memory on the terminal. Transfer files by 'dragging and dropping' or 'copying and pasting' from the PC to the specified location on the terminal.

To download an installation file for the desktop PC, which, when unpacked has been compiled for VRC 89XX, the file must first be executed so that it unpacks itself on the desktop PC:

a. Select `Tools`, then `Add/Remove Programs`. The following screen appears:

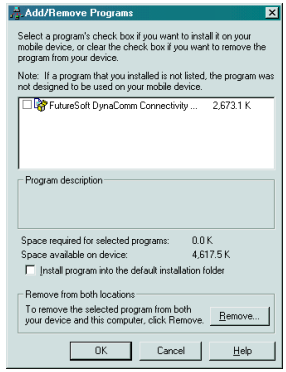


Figure 6-23. Add/Remove Programs Screen

b. To install the application on the terminal, check the box next to the application(s) to be installed. If the `Install program into the default installation folder` is checked, the application files are transferred to the Windows directory on the terminal. If this is unchecked, you may select the destination of the application in the screen that appears:

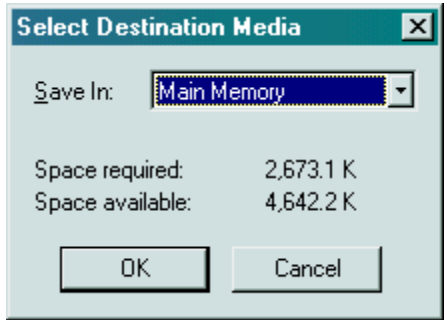
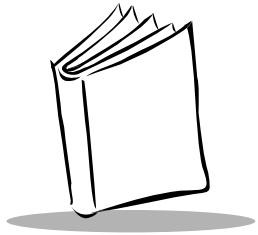


Figure 6-24. Select Destination Media Screen

Refer to *DRAM File System* on page 4-18 to increase memory if the program memory availability is lower than required.

3. Continue with the on-screen prompts on the PC and the terminal to complete the application installation.

Note: *If the application, or part of it, is installed in DRAM, it will be lost if the back-up battery is allowed to discharge or a cold boot is performed.*



Chapter 7
ActiveSync

Introduction

This chapter describes communication between the terminal and a desktop PC using ActiveSync. The minimum desktop PC requirements for ActiveSync are:

- Windows 2000, Windows NT4 with Service Pack 3 or later, Windows Me, or Windows 95/98
- Desktop computer with a Pentium processor for Windows NT (166 MHz required for Windows 2000), Windows Me (150 MHz required for Windows Me), or a 486/66 DX or higher processor (Pentium P90 recommended) for Windows 95/98
- 16MB of memory for Windows 95/98 (more memory will improve performance) or Windows NT Workstation 4.0 (32MB recommended for Windows NT, 64MB recommended for Windows 2000), 32MB of memory for Windows Me
- Hard disk drive with 10 to 50MB of available space (actual requirements vary based on selection of features and user's current system configuration)
- Available 9 or 25-pin communications port (adapter required for 25-pin communications port), or USB port (available for Windows 98se/ME/2000 or XP only)
- CD-ROM drive
- VGA graphics card or compatible video graphics adapter with 256 color or higher
- Keyboard
- Mouse or compatible pointing device.

Performing an ActiveSync

1. After installing the Windows ActiveSync software, restart your desktop computer.
2. From the *Start* menu on your VRC 89XX, select *Settings*, *Control Panel*.
3. Select the *PC Connections* icon.
4. Under *PC Connection*, select *change* and then select which VRC 89XX port you are using for ActiveSync (COM2 or USB port).
5. Start ActiveSync on your desktop computer and open *Connection Settings*.
6. Check the `Allow Serial Cable or Infrared Connection to this COM Port` option.

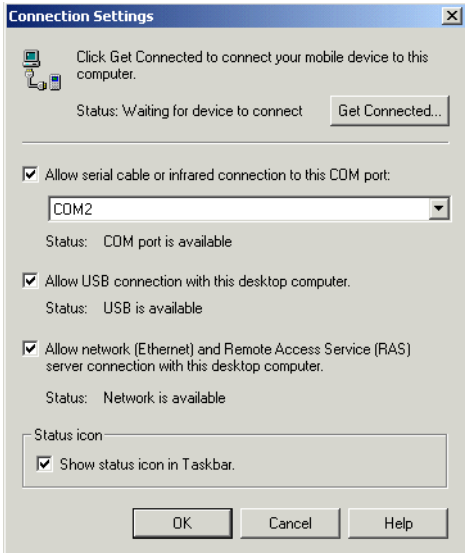


Figure 7-1. ActiveSync Screen

7. Connect the ActiveSync cable between the serial communications port on your desktop computer, and either the COM2 port or the USB port on the bottom of the terminal.

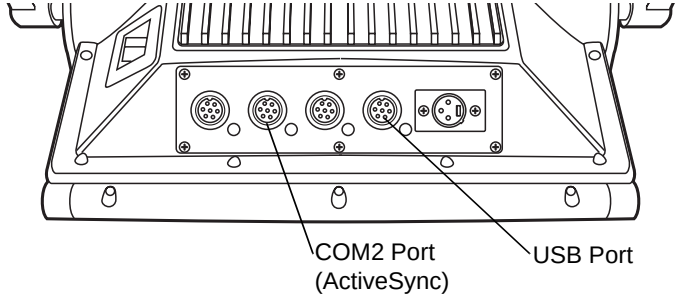
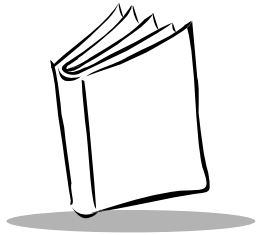


Figure 7-2. ActiveSync Cable Connection

8. ActiveSync automatically starts on your desktop computer, and connects to the terminal.
   If no connection occurs, check the PC Connections setting in the *Control Panel* on the VRC 89XX. On the *PC Connections Properties* screen, select the *Allow connection with desktop computer when device is attached* checkbox.



Chapter 8
Maintenance and Troubleshooting

Maintaining the Terminal

The terminal is factory-sealed and contains no user-serviceable parts. Only qualified Symbol Service Centers should service the terminal. Refer to *Symbol Support Center* on page ix.

Protective caps are attached to the ports on the back of the terminal. Place them over unused ports for protection.

Cleaning the Terminal

The terminal requires a minimal amount of maintenance. To prolong its life and avoid problems, keep the terminal clean. Use a clean, soft cloth dampened with a mild cleanser such as soap and water to clean the terminal. Do NOT use cleaners containing a high percentage of alcohol, such as Isopropyl Alcohol. Do NOT use abrasive paper/cloth or abrasive/corrosive cleaners.

Storage

Store the terminal in a cool, dry place away from dust. The terminal's internal battery completely discharges in 72 hours. All non-volatile data is lost when the internal battery is fully discharged.

Troubleshooting

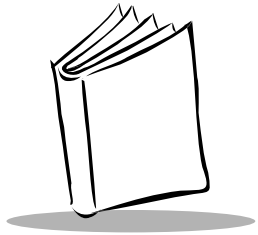
Table 8-1 on page 8-2 covers some common terminal problems and corrective actions to take.

Table 8-1. Terminal Problems

Symptom	Possible Cause	Action
Terminal does not power on or shuts off suddenly.	Power switch on back of terminal is in the Off position.	Turn the power switch on.
	Power cable not connected or unplugged.	Connect power cable to power cable portion underside of terminal. Turn the power switch on, then press the Suspend Button to boot up the terminal.
	If the terminal is powered by a vehicle battery, the vehicle battery is depleted.	Replace or charge the vehicle battery.
Cannot see characters on display.	Terminal not powered on (Power LED is off).	Turn the power switch on. Press the Suspend Button.
	Screen is too bright/dark.	Adjust the brightness; see *Adjusting the Brightness* on page 4-14.
	Display not adjusted properly.	Select Display in the Control Panel settings and adjust the display.
	The terminal is in Suspend mode (indicated by a yellow Power LED).	Press the Suspend Button to turn on the terminal.
Touchscreen not working.	Display not properly calibrated.	Recalibrate the screen through the Control Panel Calibration utility. If problem continues, contact Symbol Support Center. See *Symbol Support Center* on page ix.
Optional scanner does not operate.	Scanner is not properly connected to the terminal.	Connect the scanner to the COM1 port and power up the terminal. If the problem continues, refer to the scanner Quick Reference Guide.

Table 8-1. Terminal Problems (Continued)

Symptom	Possible Cause	Action
No sound is heard when you tap the touchscreen or press a key.	Volume is turned down.	Adjust the volume in the Control Panel.
	Application currently running disabled the sound.	Configure the application to enable the sound.
	Faulty speaker.	Contact Symbol Support Center. See *Symbol Support Center* on page ix.
Missing pixels on the display.	Faulty LCD.	Contact Symbol Support Center. See *Symbol Support Center* on page ix.
COM1 or COM2 port is not working.	Another application is using the port.	Stop the application using the port and retry. Use COM1 port for scanning and COM2 port for ActiveSync.
No response when ActiveSync is initiated.	ActiveSync cable not connected properly.	Connect the ActiveSync cable.
	ActiveSync is not configured properly in the Control Panel.	Configure ActiveSync in the Control Panel. See *Performing an ActiveSync* on page 7-2.
No keys are working on the optional keyboard.	The keyboard is not properly connected to the terminal.	Check the cable connections between the keyboard and the terminal.
	The application does not require keyboard input.	Configure the application to use the keyboard.
	Terminal is not responding.	Cold boot the terminal.
Application does not respond.	Terminal is not communicating with the AP (Communication LED is solid red).	Bring the terminal closer to the AP. If problem continues, contact Symbol Support Center. See *Symbol Support Center* on page ix.



Appendix A
Specifications

Environment

The VRC 89XX is designed to operate in harsh environments. Table A-1 below summarizes the terminal's intended operating environment.

Table A-1. VRC 89XX Operating Environment

Operating Temperature	**Non-heated version:** 0° C to 50° C (32° F to 122° F) **Heated version:** -30° C to 50° C (-22° F to 122° F)
Humidity	5% to 95% non-condensing
Shipping and Storage Temperature	-20° C to 60° C (-4° F to 140° F) 85% Relative Humidity
Electrostatic Discharge	±15 kv
Sealing	IP65 and Mil Standard 810E (windblown rain and dust)
Altitude/Temperature	15,000 ft / 12° C (54° F) Cargo Storage 8,000 ft / 27° C (81° F) Operating
Vibration	$0.04g^2$/Hz, Random (20Hz to 2kHz)
Cargo/Packaged	4 ft (1.2 m) drop to concrete @ 0° C (32° F), 23° C (73° F), 50° C (122° F)
Rain and Drip	Sealed to IP65 MIL-STD 810E Proc. 506.3 (Dripping Rain)
Dust	Sealed to IP65

Table A-1. VRC 89XX Operating Environment (Continued)

Impact	130 gm (4.6 oz), 31.75 mm (1.25 in.) diameter chrome steel ball dropped from 50 cm (19.6 in.) onto any surface including display
Thermal Shock	-20° C to 70° C (-4° F to 158° F)
ESD	15 kV Air, 8 kV Contact, 2 kV Charged Body (RH less than 50%) per IEC 801-2

Pin-Outs

Table A-2. COM1 Serial Port Pin-Outs

Pin	Description
1	CTS
2	+12V
3	Rx Data (RS-232)
4	+5V
5	RTS
6	Tx Data (RS-232)
7	Ground

Table A-3. COM2 Serial Port Pin-Outs

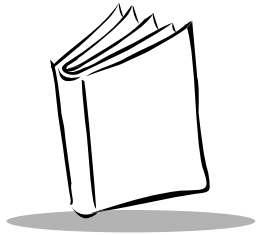
Pin	Description
1	CTS
2	Connection Detect (1) This input is used with Connection Detect (2) to automatically detect whether the terminal is connected to another device. 0=Not connected to another device 1=RS-232 detected
3	Rx Data (RS-232)
4	Connection Detect (2)
5	RTS
6	Tx Data (RS-232)
7	Ground

Table A-4. Keyboard Port Pin-Outs

Pin	Description
1	+12V supply for backlight and heater
2	+5V supply to keyboard logic
3	Ground
4	PS2 clock signal (12.5kHz)
5	PS2 data

Table A-5. USB Port Pin-Outs

Pin	Description
1	D- for host operation
2	Not connected
3	DataX for slave operation
4	+5V supply output for host operation
5	+5V supply input for slave operation (capable of supplying 1.1A)
6	D+ for host operation
7	DataY for slave operation
8	Ground



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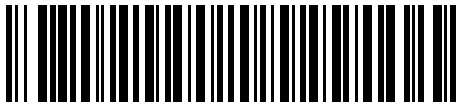

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